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ABSTRACT

This special theme issue reports key results from a comprehensive assessment of skill development among the rural workforce and of rural education and job training in rural areas. This comprehensive assessment had three goals: to develop better measures of rural skills than were previously available, to identify human capital initiatives that contribute to rural economic development, and to develop a fuller understanding of barriers that prevent rural individuals from obtaining needed job skills. Six of the eight articles in this issue report extensive statistical analyses of major government surveys of households, students, and schools. These surveys include the 1987-88 Schools and Staffing Survey, the National Assessment of Educational Progress, the National Education Longitudinal Study of 1988, the National Longitudinal Survey of Youth, the 1992 National Adult Literacy Survey, and job training supplements to Current Population Surveys. Across the articles, major themes emerge: (1) the rural skill development system is a complex composite of troubling weaknesses and surprising strengths; (2) rural schools are more effective than expected based on their resources; and (3) many rural areas are trapped in a vicious circle, in which low worker skills and low demand for high-skilled workers are mutually reinforcing. Articles are: (1) "Introduction to Special Issue on Rural Skills" (Paul L. Swaim); (2) "Rural Schools: Fewer Highly Trained Teachers and Special Programs, but Better Learning Environment" (Dale Ballou, Michael Podgursky); (3) "Nonmetro Student Achievement on Par with Metro" (Elizabeth J. Greenberg, Ruy A. Teixeira); (4) "More Rural Students Are Graduating from High School, but a Serious Dropout Problem Remains" (Kathleen M. Paasch, Paul L. Swaim); (5) "Going Away to College and Wider Urban Job Opportunities Take Highly Educated Youth Away from Rural Areas" (Robert M. Gibbs); (6) "Workers with Higher Literacy Skills Not As Well Rewarded in Rural Areas" (Elizabeth J. Greenberg, Paul L. Swaim, Ruy A. Teixeira); (7) "Job Training Lags for Rural Workers" (Paul L. Swaim); and (8) "More Metro than Nonmetro Students Have Access to Computers, but Their Rates of Usage Are Similar" (Elizabeth J. Greenberg). Articles contain references, descriptions of data sources and methodology used, and numerous data tables and figures. (SV)

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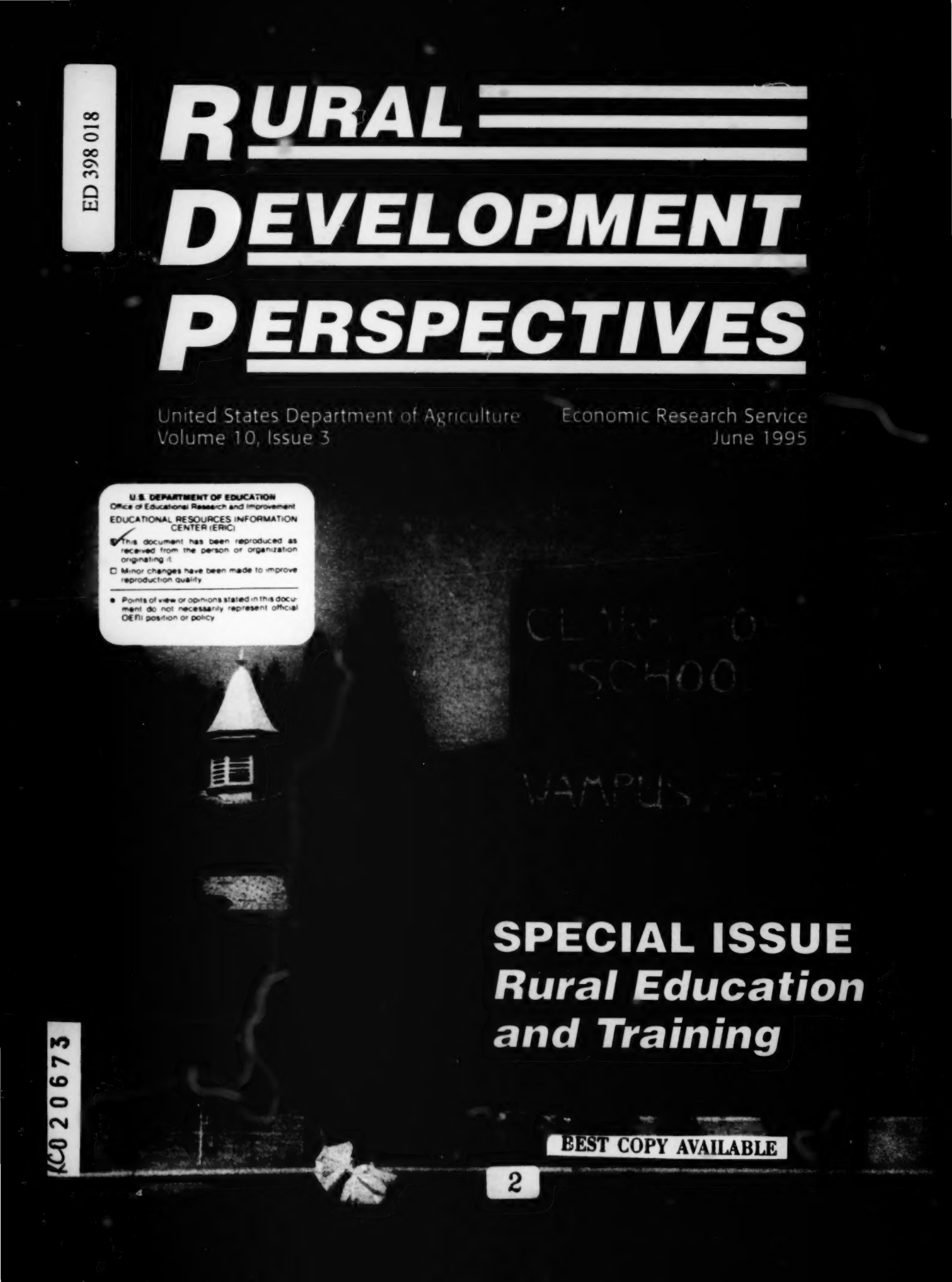

SPECIAL ISSUE
Rural Education and Training

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Editor's Notebook

This issue of *Rural Development Perspectives* is dedicated to education's role in rural development. Going beyond the simple quantity of education completed by current residents of rural areas, the authors explore the quality of the rural educational experience from several angles. They address questions such as, how trained are rural teachers, how satisfied are they with their jobs, how high do rural students score on achievement tests, how do social and locational factors affect a rural high school student's likelihood of dropping out, how does migration of young adults affect rural education levels, how high do rural adults score on skills tests, and how much job training do rural workers receive. I do not summarize the articles here because Swaim's introductory article does that admirably.

The authors were only able to research several of the questions addressed within because new data sources have become available. The authors extend special thanks to the U.S. Department of Education for granting them access to those data.

The Book Reviews feature is absent from this issue but will return in the next issue. Books and other references listed in each article's *For Further Reading* section provide a wide range of information on education for those wishing to further explore the topic.

The October 1995 issue of *RDP* will return to varied topics and will be mailed to subscribers shortly. Many subscribers have noted our year lag in getting *RDP* to press. We are working hard to close the gap between cover and publication dates and expect to be on schedule by the October 1996 issue. Thank you for your continued patience.

Linda M. Ghelfi

In Memoriam

Richard Truesdale, Economic Research Service Printing Specialist for *Rural Development Perspectives* and other ERS publications, died recently. As ERS' Printing Specialist for more than 20 years, Richard Truesdale oversaw the quality of the finished product. The staff of *Rural Development Perspectives* and all of his colleagues will miss his diligence and skill, his humor, and his friendship.

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Introduction to Special Issue on Rural Skills

THE one-room schoolhouse is a potent symbol of the high value Americans place on education. In earlier times, the small country school was also an essential institution for providing a highly rural population with access to a basic education. The one-room schoolhouse survives as a cultural icon in a world more attuned to the pulses of digitized information than to the succession of the seasons. Unfortunately, today's small rural schools are more likely to be viewed as a weak link, than as a progressive force, when assessing the prospects of rural people and places.

Concern for the adequacy of rural schools is part of a larger unease that rural people and places may be increasingly disadvantaged in the evolving economy. Of course, worries that rural schools lag the times and that rural communities face economic decline and depopulation are not new. These concerns acquired increased urgency, however, when the general vitality of rural areas during the "Rural Renaissance" of the 1970's was succeeded by economic setbacks and quickened outmigration during the 1980's. Some of the economic setbacks reflected transitory factors, such as the unsustainable debt burdens that resulted in the "farm crises" of the early and mid-1980's, but less easily reversed changes in economic structure threaten permanent deterioration of the rural economic niche.

Complex and rapidly changing technologies and intensified global competition are reshaping the American economy. Many wonder if rural workers and firms will be competitive in an economy increasingly dominated by workers and firms with the information, skills, and other resources required to develop and apply advanced technologies and to pursue global competitive strategies. The apparent increase in the importance of advanced education and technical knowledge for competitive economic success also suggests that better education and job training have become essential elements of viable programs for rural economic revitalization.

Economic Research Service Conducts a Comprehensive Assessment of the Skill Development System for the Rural Workforce

This issue of *Rural Development Perspectives* reports key results from a comprehensive assessment of skill development among the rural workforce that was undertaken by the Economic Research Service (ERS). The main purpose for this assessment was to develop a solid factual foundation for assessing public and private initiatives to improve rural education and job training. Because rural communities and institutions show particular strengths, and weaknesses, some lessons for national efforts to improve workforce skills also emerge.

National Context

Concerns for the ability of local firms to compete and the quality of the jobs that they provide are not limited to rural parts of America. These concerns are also well grounded in recent national economic experiences. After rising rapidly during the 1950's and 1960's, average wages, adjusted for inflation, began to stagnate in the early 1970's. Inequality among wage earners has also risen sharply, so that low-education, minority, and other vulnerable groups have experienced large real-wage declines and have fallen farther behind less vulnerable groups. For example, male high school graduates in their first few years out of school earned 29 percent less in 1991 than in 1973, and high school dropouts fared even worse (Mishel and Bernstein, 1992). There is a very real chance that many Americans entering the labor force in recent years will be poorer than their parents.

No single cause accounts for the declining availability of good jobs, but inadequate workforce skills are widely believed to play an important role. During most of the 1980's, human capital concerns focused on the perceptions that American workers had too little schooling or that the quality of American public education was too low. More recent studies have also emphasized that most American firms do not provide their noncollege workforce with adequate job training and, in any case, do not organize pro-

Paul Swaim is an economist at the Organization for Economic Cooperation and Development, Paris, France.

duction to make good use of the cognitive abilities of front-line workers (Commission on the Skills of the American Workforce, 1990; Reich, 1992). These later assessments depict the American economy as facing a choice between a high-skill, high-wage development path and a low-skill, low-wage path, and advocate public policies encouraging firms to select "high road" competitive strategies.

Rural Perspective

Concern for low and declining job quality has a special urgency for rural areas (Gorham, 1992). During the 1980's, rural economic stress was highly visible in the form of plant closings, farm foreclosures, and high rates of unemployment. Less visible, but perhaps more symptomatic of a long-term worsening of rural employment opportunities, was the sharp decline in rural wages compared with urban wages. Between 1979 and 1993, average nonmetro earnings fell an inflation-adjusted 12.6 percent, while metro wages fell just 2.4 percent (Swaim, 1995). As a result, the rural-urban gap in average weekly earnings rose from $65 to $108 (both figures in 1993 dollars), and the share of the rural workforce receiving poverty-level wages (wages so low that a full-time, year-round worker is unable to support a family of four above the poverty line) rose from 34 to 43 percent.

Rural educational levels are lower than urban levels, and recent economic trends have been particularly unfavorable to low-education and rural workers. This coincidence suggests that the deterioration of rural employment opportunities may be rooted in the inadequate skills of the rural workforce. However, a 1991 study by ERS casts some doubt on this reasoning and provides an important point of departure for our new study (McGranahan and others).

Motivations for Our Study

The 1991 ERS study showed that the high-skill, high-wage jobs created during the 1980's were disproportionately urban, a pattern which resulted in low demand for educated workers in rural areas and calls into question simple "supply" strategies for rural revitalization, which rely on increased years of schooling alone to generate large rural growth. These findings did not, however, imply that improved workforce skills are not an important component of viable rural development strategies. Rather, they indicated a need to examine skill supply in rural areas in more detail than has heretofore been done. The new ERS study summarized in this issue attempts to meet that need.

In conducting the comprehensive examination of the rural skill development system, we attempt to serve three purposes. First, we develop much better measures of rural skills than were previously available. These measures allow us to examine the assertion that rural workforce skills are inferior to urban. We find that this common perception is mistaken, in part, and masks important areas of strength in rural skill supply that can be built upon and more effectively tapped by rural development policy. Prior to our study, good measures of rural workers' skills simply did not exist. Average years of schooling typically had been relied upon to assess rural workforce quality, even though educational attainment is a poor indicator of the extent to which individuals possess the cognitive skills and technical knowledge required by more demanding (and better paying) jobs. We compile and analyze a number of additional measures of rural skills, such as achievement test scores, adult literacy test scores, and job training to upgrade skills. The result is a much fuller portrait of the state of rural human capital.

The second purpose of our study is to contribute to the ongoing search for human capital initiatives that can make important contributions to rural economic development. Even though a simple supply development strategy is questionable, more sophisticated skill-upgrading strategies probably can contribute to economic revitalization, at least in some rural areas. Employment will probably continue to fall in resource-intensive industries, such as farming and mining, and routine manufacturing, which have provided much of the rural economic base. The major challenge for rural development policy today is to create new or upgraded rural niches in the evolving national economy. If they are to succeed, these economic diversification and modernization strategies frequently will need to include initiatives to upgrade workers' skills. Our analysis of rural skill supply provides some of the information needed to identify more sophisticated skill-upgrading strategies, for example, by showing how the low literacy of certain groups of rural workers is a barrier for employers who might otherwise adopt skill-intensive, high-road competitive strategies.

Our third motivation for studying the skill development system for rural workers reflects equity concerns. All rural youths deserve equal access to the life opportunities opened up by a good education and advanced vocational training, but some may face particular barriers to developing their human capital. The concern for equal access has become more urgent since the late 1970's, because the labor market returns to education and job training have increased dramatically. Our comprehensive assessment of rural schools and job training provides a fuller understanding of the barriers preventing too many rural individuals from obtaining the skills needed to qualify for good jobs and suggests policies to lower those barriers.

How We Proceeded

The ERS research team assessed rural education and job training from the perspectives of rural people and of rural

places. From the perspective of rural individuals, the basic question that we pose is "Do rural residents have adequate educational and vocational training opportunities?" In posing and analyzing this people-centered question, we implicitly assume that all rural residents should receive a good primary and secondary education and have the opportunity to pursue advanced education and job training, if they desire to do so and have the necessary ability. From the perspective of rural places, the basic question that we pose is "Does the rural skill development system supply the workforce competencies rural places need to be competitive?" In posing and analyzing this place-centered question, we implicitly assume that rural economic revitalization is desirable and can be furthered by conscious efforts to adapt rural institutions and practices to changing conditions.

Our strategy for assessing rural education and job training is to follow rural individuals through important stages of their "careers" as learners. At each stage, we monitor educational progress and identify economic, social, and institutional factors that are either facilitating their progress or impeding them from obtaining the skills and knowledge needed to participate fully in the evolving national economy. To the extent possible, we analyze the specific content of the skills that are learned by students or workers and compare these skills with job requirements. The knowledge and insights that emerge help to answer both the people and place-centered questions, but the perspective is a little different in each case. When assessing the opportunity structures facing rural individuals, attention typically focuses on groups who lag in the quantity or quality of their learning and the disadvantages those patterns may reflect. When assessing rural education and training as it affects economic development, rural-urban discrepancies in skill supply are the focus.

New Data Sources Tapped

New data sources on human capital development are a major strength of our approach. Each of the six articles that follow reports extensive statistical analysis of a major government survey of households, students, or schools that sheds new light on the issues being addressed. Several of these data sources are new surveys sponsored by the U.S. Department of Education that are unprecedented in their content and have only recently become available to the research community. These include surveys of schools, teachers, students, and the literacy skills of adults.

These new data sources were developed in response to the upswing of policy concerns related to education and workforce quality. In several cases, the ERS research team had to develop special versions of these data files that were capable of differentiating rural conditions from those prevailing in urban areas. This involved negotiating access to information that is suppressed, to protect respondent confidentiality, on public use versions of these files. We are grateful to the U.S. Department of Education for allowing us access to these data.

Preview of the Articles

The first three articles focus on primary and secondary education. In the first article, Ballou and Podgursky analyze rural primary and secondary teachers and schools. They find that rural schools are relatively poor in terms of certain resources, but appear to function more effectively than more urban schools, perhaps due to their smaller sizes and fuller integration with the surrounding community. Greenberg and Teixeira examine educational achievement in the second article and find that—despite less access to advanced courses—rural high school seniors receive an education comparable in quality to urban students' education. The third article, by Paasch and Swaim, shows that rural high school completion rates have improved dramatically in the last 20 years but a significant dropout problem persists, which is deeply rooted in the economic disadvantages of some students' families.

The final three articles follow individuals beyond high school into their adult years. Gibbs examines college attendance and its relationship to migration. Higher education emerges as an important weak link in the rural skill development system. Greenberg, Swaim, and Teixeira analyze the literacy and numeracy of rural adults and show that the rural workforce has somewhat lower literacy skills than urban workers. Rural workers, however, earn less than urban workers with the same literacy skills, suggesting that increasing rural literacy may not be enough to attract more high-paying jobs to rural areas. Finally, my article assesses job training, identifying and analyzing a growing rural gap in skill-upgrade training for workers.

Recurrent Themes Emerge

Several recurrent themes emerge in these articles. Three are briefly summarized here, but the reader will have to turn to the individual articles for the details.

The first theme is that the rural skill development system is a complex composite of troubling weaknesses and surprising strengths. Rural gaps in higher education, adult literacy, and job training are examples of the areas of weakness. Certain rural groups, including minorities and southerners, also lag significantly in human capital development. An important rural strength is that rural grade schools and high schools appear to do as good a job educating their students as urban schools do, but with fewer resources. Two-year colleges that specialize in vocational education are also a rural strength. Rural educational and development policies can build on these strengths.

The second theme is that institutions matter. For example, the effectiveness of rural schools exceeds what might be predicted based on the resources available to them. Ballou and Podgursky offer tantalizing clues about the origins of these hidden advantages but further research is clearly called for to clarify their nature. Similarly, my article indicates that the smaller size and remoteness of rural firms constitute a barrier to job training. Public programs, such as outreach programs from 2-year colleges, may be able to help some rural employers surmount this barrier.

The third theme is that rural skill supply can only be understood in combination with rural skill demand. Many of the articles offer new evidence that rural workersreceive much smaller rewards for their skills than urban workers. Many rural areas could become trapped in a vicious circle. Workforce skills (supply) stay low because the economic rewards for human capital investments (demand) are low in the local job market. But skill demand remains low, in part, because the low skills of the local workforce dissuade firms from adopting skill-intensive, competitive strategies. Of course, many other factors are at work. Nonetheless, policies to raise rural workforce skills will be much more effective when they can be combined with broader economic development strategies that increase the demand for high-skill workers in rural areas.

For Further Reading. . .

Commission on the Skills of the American Workforce, *America's Choice: High Skills or Low Wages*, National Center on Education and the Economy, Rochester, NY, 1990.

L. Gorham, "The Growing Problem of Low Earnings in Rural Areas," chapter 2 in C. Duncan (ed.), *Rural Poverty in America*, Auburn House, New York, 1992.

D.A. McGranahan (ed.), *Education and Rural Economic Development: Strategies for the 1990's*, USDA-ERS, AGES 9153, 1991.

L. Mishel and J. Bernstein, *The State of Working America, 1992-93*, Economic Policy Institute, Washington, DC, 1992.

R.B. Reich, *The Work of Nations: Preparing Ourselves for 21st Century Capitalism*, Vintage Books, New York, 1992.

P.L. Swaim, "Rural Earnings Holding Steady in the Early 1990's," *Rural Conditions and Trends*, Vol. 6, No. 1, Spring 1995, pp. 18-21.

Dale Ballou and Michael Podgursky

Rural Schools—Fewer Highly Trained Teachers and Special Programs, but Better Learning Environment

Rural schools are smaller than metro schools. Fewer rural than urban teachers have completed advanced degrees, and fewer rural students have access to advanced or remedial courses. The smaller size of rural schools may be an advantage in other ways, however, including smaller classes, more attention from teachers, and a less stressful learning environment.

In a survey article on education policy in countries that are members of the Organization for Economic Cooperation and Development (OECD), Sher described education in rural communities as a neglected "ugly duckling." Education research, particularly research on school reform, has focused primarily on urban schools (DeYoung). In part, this is a reflection of the population mix—most students are enrolled in urban or suburban schools. No doubt it also reflects public concern with the highly visible problems of American cities. The urban focus may also reflect the belief, common among school reformers of the early 20th century, that "best practice" in teaching and administration would emerge in consolidated and professionalized urban school systems, rather than in backward rural systems (Tyack).

More recently, attention has begun to turn back to rural schools. In part, this stems from concern with rural economic development and the role that education and training can play in preparing the work force for an era of rapid technology change. Some educational researchers have also argued that small rural schools can in fact provide lessons for urban school reform (Hobbs, 1989 and 1995). Indeed, the literature on school reform now often emphasizes the benefits of small school size, particularly for disadvantaged students (Goodlad, Friedkin and Necochea).

Dale Ballou is an assistant professor in the Department of Economics, University of Massachusetts, Amherst, and Michael Podgursky is chairman of the Department of Economics, University of Missouri-Columbia.

Unfortunately, research on rural schools has been hampered by a relative lack of data. Only recently have data for nationally representative samples of rural teachers and schools become available. These new data bases, developed by the National Center for Education Statistics, now make possible more extensive and systematic comparison of rural and urban schools (Stern). We used the 1987-88 Schools and Staffing Survey (SASS) to investigate differences between rural and urban schools. (See Data and Methods, p. 15, for a description of the survey and the definition of rural and urban areas we use in this article.)

Consistent with earlier studies, we find that rural schools are indeed smaller and less specialized than their urban counterparts. They also appear to be at a disadvantage in recruiting the most highly qualified teachers. As a result, rural schools do not offer as rich a curriculum to their students.

This loss of curricular diversity is not, however, the whole story. In several respects, rural schools appear to offer a learning environment superior to that available in other communities, particularly large urban centers. Classes are smaller. Students have greater opportunities for interaction with their teachers, who in turn enjoy greater control and autonomy in the classroom and report fewer classroom problems than do their urban counterparts.

School Size and Program Offerings

In 1940, there were 117,108 public school districts in the United States. By 1960, the number fell to 40,520 and by 1990 it leveled off at 15,367 (National Center for

Education Statistics). Pressures for this massive consolidation arose from "above," for the most part from education professionals and administrators in State education departments who considered small districts and schools inadequate, inefficient, and unprofessional. Of course, education departments also found it easier to monitor and regulate a few consolidated districts than many localized ones.

While this sweeping consolidation largely eliminated the one-room schoolhouse, considerable differences between the sizes of rural and urban schools persist (table 1). The average rural school enrolls only half as many students as a central city school. This difference is most pronounced at the secondary level, where the average rural high school is roughly a third the size of the typical urban high school.

Rural school district consolidations were undertaken, at least in part, to provide better educational opportunities and a wider range of services for rural students. While there has doubtless been progress in this respect, students in rural high schools remain less likely to benefit from specialized programs and advanced courses (table 2).

We looked at both student enrollment in those courses and hours teachers spent teaching them. High school students in rural communities and small towns are less likely than their counterparts in metro areas to be enrolled in special programs for the gifted or offering remedial instruction. They are also less likely to be taking an advanced mathematics class (such as advanced algebra, analytical geometry, trigonometry, or calculus) or a science course beyond biology (such as physics or chemistry) than are suburban students, but as likely to be enrolled in these courses as students in the other geographic areas. Interestingly, the share of the student body in college preparatory courses is no smaller in rural schools than in metro schools. Only a very small fraction of rural students receive instruction in computer programming or other uses of computers, although this is also true of students in the other types of communities.

To investigate possible causes of lower rural enrollment in gifted and remedial programs, we used a regression procedure to control for other school characteristics that would influence the availability or demand for these courses. Our controls include the level of the school (elementary, middle, secondary, combined), and measures of the socioeconomic characteristics of the student body—the percentage of students eligible for free or reduced-price lunch and the percentages of students who are Black or Hispanic. The results suggest that, even after adjusting for these factors, rural schools offer fewer specialized programs compared with schools in urban areas. For example, rural schools have smaller shares of students in bilingual and English as a second language programs even after controlling for the percentage of Hispanic students, an indication that this population receives different services depending on where it goes to school.

Table 1

Schools and students by county type, 1987-88

Rural schools average less than half as many students as central city schools

		Metro			Nonmetro	
Item	Unit	Central city	Suburb	Small city	Small town	Rural
Schools	Thousands	13.5	10.6	22.9	15.1	10.5
Share of all schools	Percent	18.6	14.5	31.5	20.8	14.5
Students	Thousands	9,313	6,027	12,580	6,500	3,348
Share of all students	Percent	24.7	16.0	33.3	17.2	8.9
Students per school	Number	688.0	570.3	549.1	430.4	317.7
High schools	Thousands	2.1	1.7	3.7	2.9	2.3
Share of all high schools	Percent	16.4	13.5	29.3	22.8	18.0
High school students	Thousands	2,694	1,420	3,532	1,732	886
Share of all HS students	Percent	25.2	17.2	33.1	16.2	8.2
Students per high school	Number	1,297	1,073	949	598	389

Note: See Data and Methods, p. 15, for definitions of county types.
Source: Calculated by the authors using data from the 1987-88 Schools and Staffing Survey.

In sum, fewer rural students are enrolled in remedial or gifted programs and rural teachers average fewer hours of instruction. Availability of and teacher time devoted to advanced math, science, computer, and placement courses do not vary much across the geographic areas, except suburban areas lead all other areas in advanced math and science courses. Smaller rural schools may not have enough students to support running remedial and gifted programs, but they appear to offer some curricular diversity, most of which is geared toward college-bound students.

Rural Teachers Lag Urban in Educational Background and Pay

Earlier research has often emphasized the difficulty of recruiting teachers to rural areas, the quality of the rural teaching workforce, and looming "teacher shortages" (Darling-Hammond, Dunathan, Swift). Low salaries are frequently cited as a contributing factor (Horn).

Rural teachers average a year's less teaching experience than metro teachers (table 3). On the other hand, they average a year more experience at their current school, at least compared with central city teachers. This finding suggests that interschool mobility of rural teachers is lower. Both rural and urban schools, however, report quite high annual rates of teacher turnover, between 9 and 10 percent.

Table 2

Percentage of student hours spent in special and advanced courses

Rural students average less time in gifted and remedial programs than do students in any other area, but lead other areas' students in time spent in advanced placement courses

	Metro			Nonmetro	
Courses	Central city	Suburb	Small city	Small town	Rural
	Percent				
Advanced mathematics	2.4	3.3	2.7	2.1	2.5
Advanced science	2.5	3.3	2.7	2.8	2.6
Computer programming	.5	.6	.9	1.0	.7
Advanced placement	4.1	4.3	4.0	4.7	4.8
Gifted	5.3	4.8	4.3	4.0	2.7
Remedial	5.3	4.8	4.3	4.0	2.7

Notes: See Data and Methods, p. 15, for definition of county types. Hours devoted to these courses are calculated by summing the time per week each teacher spent teaching the subject multiplied by the number of students in the class. This is divided by a student-weighted sum of all teachers' classroom hours to obtain the percentages in the table.

Source: Calculated by authors using data from the Schools and Staffing Survey.

Does teacher turnover present greater difficulties for rural schools? Is there a "teacher shortage" in rural schools? SASS asked districts to indicate the number of advertised teaching positions which were left unfilled or which were filled by a substitute as of October 1. The highest incidence of such vacancies was in central city schools, where 0.8 percent of all teaching positions were still waiting to be filled by qualified permanent personnel. The incidence was lower in other areas and smallest in rural areas and small towns (0.47 and 0.45 percent, respectively). Their turnover rates were not lower because rural and small town districts canceled positions they could not fill—cancellations were only 0.33 percent of all positions in rural districts, the same percentage as in suburban systems.

These figures do not support the claim that rural schools are unable to recruit teachers. However, when teachers who lack appropriate certification credentials cannot be hired, State regulations usually allow for "temporary" or "emergency" certification. Thus, the incidence of unfilled positions may fail to reflect fully the problems faced by rural schools in recruiting instructors. But, again, the SASS shows that virtually all teachers hold standard certification in their principal field (table 3). Over 93 percent of teachers in all areas are certified.

While the evidence strongly suggests there is no absolute shortage of teachers, districts in metro areas appear to have a better applicant queue from which to select. Rural teachers are less likely to have graduate degrees or to have graduated from a "selective" college or university than their urban counterparts. While research has failed to establish a strong relationship between the level of a teacher's highest degree and effectiveness in the classroom, there is considerably stronger evidence that persons who attended better undergraduate institutions are more capable teachers (this literature is reviewed in Ballou and Podgursky). The fact that a rural teacher is only half as likely to have graduated from such a program suggests that rural districts are at a disadvantage in recruiting.

Concern about the low standards for admission to programs of teacher education, as well as a new emphasis on academic rigor in undergraduate education, has led a number of States to require that prospective teachers at the secondary school level major in the subject they are to teach. In this light, we compare the academic preparation of teachers by community. Rural secondary school teachers are less likely to have majored in an academic subject (as opposed to education) than are secondary school instructors in metro areas. In particular, central city and suburban teachers were a third again as likely to have majored in math or science, subjects where the shortage of adequately trained instructors is particularly severe.

The SASS also allows us to investigate whether lower pay is part of rural areas' problem in recruiting the most highly trained teachers. Two measures of teacher pay in rural and urban schools: average pay offered beginning teachers with a bachelor's degree and average salaries for teachers with a master's degree and 20 years experience, confirm lower rural salaries (table 4). Since virtually all school districts follow "single salary schedules" (that is, pay teachers at all levels and specialties according to a single schedule based on seniority and educational credentials), we do not disaggregate pay by school level.

Since differences in the cost of living among areas may affect salary levels, we also show an adjusted teacher pay deflated by a state-level metro-nonmetro cost of living index. The estimates are based on cost-of-living indexes prepared by the Center for the Study of Educational Finance at Illinois State University (McMahon and Chang) and are presented as a lower bounds of the salary differential. No data are available on the price and quantity of goods and services purchased in all local areas which would provide the information needed to construct a true cost of living index for all areas nationwide.

Table 3

Characteristics of full-time teachers, 1987-88

Fewer rural teachers have completed degrees in the academic subject they teach and fewer graduated from the most selective colleges

		Metro			Nonmetro	
Characteristic	Unit	Central city	Suburb	Small city	Small town	Rural
Full-time experience	Years	16.4	16.9	15.8	15.1	15.3
At current school	do.	8.9	9.7	8.9	9.4	9.7
Turnover rate[1]	Percent	10.4	9.5	9.7	9.1	9.7
Certified[2]	do.	93.5	97.1	96.6	96.7	96.8
MA	do.	51.7	53.5	45.4	41.1	36.8
Ed.D./Ph.D.	do.	1.3	.8	.6	.5	.4
BA in academic field[3]	do.	42.1	39.3	34.3	31.3	28.3
Math or science BA	do.	12.5	12.5	10.7	10.6	9.3
Graduate of selective college[4]	do.	24.5	26.9	19.1	15.3	12.1

[1]Turnover rate is number of teachers who left during the 1986-87 academic year divided by the number of teachers employed as of October 1987.
[2]Certified is holding standard State certification in the subject matter taught.
[3]Teacher received a bachelor's degree in the academic field they teach rather than or combined with a degree in education.
[4]Selective colleges are those defined as "most," "highly," or "very" competitive in Barron's Profile of American Colleges, 1995.
Note: See Data and Methods, p. 15, for definition of county types.
Source: Calculated by authors using data from Schools and Staffing Survey.

Table 4

Teacher salaries, 1987-88

The rural-urban salary gap is wider among more educated, more experienced teachers than among those just starting out; applying an estimated cost index lowers the gaps, but does not close them

	Metro			Nonmetro	
Item	Central city	Suburb	Small city	Small town	Rural
			Dollars		
Current salary:					
Starting out[1]	20,030	19,084	17,834	17,024	16,530
Experienced[2]	35,398	34,251	30,039	27,560	26,245
Salary after applying cost index					
Starting out[1]	17,836	16,960	16,596	16,943	16,530
Experienced[2]	31,566	30,577	28,022	27,464	26,245

Note: See Data and Methods, p. 15, for definition of county types.
[1] Bachelor's degree and no previous experience.
[2] Master's degree and at least 20 years teaching experience.
Source: Calculated by authors using data from the Schools and Staffing Survey and an estimated cost of living index from McMahon and Chang.

McMahon and Chang's estimated index is built from available data and should be viewed as a possible bound, not an exact measure of cost-of-living differences. While average pay for starting teachers is 21 percent higher for central city teachers than for rural teachers, applying the estimated cost index puts a lower bound on the difference of 8 percent. The gap is considerably wider for experienced teachers, 35 percent higher on average and still 20 percent higher after applying the estimated cost index.

Interpretation of these rural-urban pay gaps is complicated given the mix of amenities (and disamenities) in rural versus urban areas and the wide dispersion of individual preferences regarding these amenities. In a competitive labor market, workers make mobility decisions not just on the basis of pay, but on the basis of their perceptions of locational and job amenities as well. Thus, the fact that a science teacher in rural Montana earns $25,000 while a similar teacher in Chicago earns $40,000 does not mean that the former would prefer to swap jobs with the latter (or vice versa). When asked about the level of satisfaction with their pay, rural teachers were as satisfied as teachers in other locales, even more satisfied than suburban teachers.

To summarize, rural schools have not been able to staff their schools with teachers whose academic background and professional preparation equal those of central city and suburban instructors. This is particularly apparent when we look beyond formal teaching credentials to indicators of the quality of undergraduate education and subject-matter knowledge. While lower salaries may hamper rural recruitment, the rural disadvantage likely reflects other difficulties in recruiting teachers. For example, many teachers are in two-earner families requiring job opportunities for both themselves and their spouses. If rural communities do not have job opportunities for the spouses, they will have difficulty recruiting the teachers.

Rural High School Teachers Can Concentrate on Fewer Students

While rural schools may not offer the widest array of courses or attract the most highly trained teachers, there are offsetting advantages to attending a rural school. Particularly noteworthy are differences in student/teacher ratios (table 5). We report two measures. The first is the number of students at the high school divided by the number of teachers. Since this ratio can be heavily influenced by the presence of teachers with specialized assignments who deal with very small numbers of students, we present an alternative measure — the number of students taught on an average day by high school instructors of departmentalized subjects (for example, English or history). By both measures, rural high school students clearly benefit from a more favorable student/teacher ratio. Indeed, the typical high school teacher in a rural school has only three-fourths as many students as an instructor in a central city or suburban community.

Table 5

Ratio of students to high school teachers, 1987-88

Teachers in rural schools deal with fewer students than teachers in more urban schools do

	Metro			Nonmetro	
Students	Central city	Suburb	Small city	Small town	Rural
			Number		
Per teacher	21	18	19	17	16
Taught per average day by departmental teachers[1]	104	99	96	85	75

Note: See Data and Methods, p. 15, for definition of county types.
[1]Departmental refers to teachers of the generally required courses in English, history, math, science, and social studies.
Source: Calculated by authors using data from the Schools and Staffing Survey.

Rural School Environment Appears to Be Better

Along with lower student/teacher ratios, teacher assessments indicate that the rural school environment may be more conducive to learning. We find several striking differences between urban and rural teachers' assessments of school problems, opinions on school leadership and their own autonomy, and time spent in after-school activities involving students.

In table 6, we report the affect of community type on teachers' assessments of various problems at their schools. The teachers' responses were categorized as 1=serious problem, 2=moderate problem, 3=minor problem, and 4=not a problem, so the higher the score shown in the table the less of a problem the issue is perceived to be by the average teacher.

On almost every count, rural schools provide a more attractive learning environment than do urban school systems. On 9 of 12 problems, ranging from student tardiness and absenteeism to student possession of weapons and verbal and physical abuse of teachers, rural teachers gave their schools better marks than did central city instructors. On all these items rural teachers also rated conditions in their schools better than suburban and small city teachers rated theirs, but by smaller margins. In only two cases, student pregnancy and student use of alcohol, did rural teachers report a more serious problem than their counterparts in central cities. Teachers in all areas

Table 6

Full-time teachers' assessments of school problems

Nonmetro teachers report less serious problems, except for student pregnancy, alcohol use, and drug abuse

Responses	Metro			Nonmetro	
	Central city	Suburb	Small city	Small town	Rural
			Score		
Unadjusted responses:					
Student tardiness	2.49	2.83	2.78	2.90	2.98
Student absenteeism	2.33	2.61	2.53	2.56	2.64
Students cutting class	3.07	3.33	3.31	3.67	3.39
Physical conflicts among students	2.75	3.07	2.97	3.02	3.13
Robbery or theft	2.98	3.23	3.15	3.18	3.26
Vandalism of school property	2.76	3.04	2.99	3.06	3.16
Student pregnancy	3.31	3.43	3.34	3.25	3.26
Student use of alcohol	3.17	3.08	3.09	2.96	2.89
Student drug abuse	3.09	3.10	3.09	3.07	3.09
Student possession of weapons	3.45	3.67	3.60	3.67	3.73
Physical abuse of teachers	3.61	3.80	3.77	3.83	3.86
Verbal abuse of teachers	2.80	3.06	3.00	3.08	3.18
Responses adjusted for school characteristics:					
Student tardiness	2.55	2.83	2.78	2.88	2.97
Student absenteeism	2.38	2.60	2.53	2.55	2.65
Students cutting class	3.13	3.34	3.30	3.35	3.38
Physical conflicts among students	2.80	3.06	2.98	3.01	3.09
Robbery or theft	3.02	3.23	3.15	3.17	3.25
Vandalism of school property	2.81	3.25	3.20	3.25	3.14
Student pregnancy	3.37	3.45	3.33	3.22	3.25
Student use of alcohol	3.14	3.10	3.07	2.97	2.95
Student drug abuse	3.09	3.12	3.09	3.07	3.11
Student possession of weapons	3.49	3.67	3.60	3.65	3.71
Physical abuse of teachers	3.64	3.80	3.77	3.82	3.85
Verbal abuse of teachers	2.81	3.07	3.01	3.07	3.18

Notes: Teachers were asked to "indicate the degree to which each of the following matters is a problem in this school" and were given four possible responses to select, 1=serious problem, 2= moderate, 3=minor, and 4=not a problem.

See Data and Methods, p. 15, for a description of the regression procedure used to control for school characteristics. The adjusted scores reported here were obtained by setting teacher characteristics, percentage in school lunch program, percentage Black students, and percentage Hispanic students at their sample averages in calculating the regression equation for each geographic area.

Source: Calculated by the authors using data from the Schools and Staffing Survey.

reported equally serious problems with student drug abuse.

To determine whether the geographic differences in teachers' perceptions were caused by school characteristics rather than location, we adjusted the responses using a regression model that controlled for the effects of teacher demographic characteristics and experience, school level, and the socioeconomic status of the student population (as measured by the proportion of students eligible for free lunches and the race and ethnic composition of the student body). The adjustment had very little effect on the average score in any of the geographic categories, indicating that the rural-urban differences in teacher perceptions are not a direct function of those school characteristics.

In table 7, we report the effect of community type on teacher assessments of various dimensions of school organization. Since the allowed responses ranged from 1=strongly agree to 4=strongly disagree, a smaller score indicates a more favorable assessment. Compared with central city teachers, rural teachers average more contact with the principal regarding instructional practice and see the principal as providing more effective support with respect to discipline. Rural teachers also report more cooperative and collegial relationships with their fellow teachers and more support from parents and are more likely to find necessary resources such as textbooks and supplies available as needed. With this more supportive environment, it is no surprise that rural teachers are more likely to say that they would again choose a teaching profession.

Table 7

Full-time teachers' assessments of school organization

Nonmetro teachers report greater cooperation and coordination among teachers and more support from parents than central city teachers report

Responses	Metro			Nonmetro	
	Central city	Suburb	Small city	Small town	Rural
	Score				
Unadjusted responses:					
Principal talks with me frequently about my instructional practices	2.68	2.69	2.58	2.56	2.50
Principal lets staff know what's expected of them	1.69	1.72	1.66	1.73	1.73
Principal enforces school rules for conduct and backs me up	1.83	1.75	1.69	1.71	1.69
I receive a great deal of support from parents	2.54	2.36	2.43	2.42	2.30
Cooperative effort among staff	1.99	1.89	1.87	1.88	1.86
I make an effort to coordinate content of my courses with other teachers	1.79	1.75	1.77	1.76	1.72
Necessary materials are available as needed by the staff	2.09	1.93	1.93	1.90	1.80
If you could go back to your college days, would you become a teacher again?	2.52	2.43	2.40	2.38	2.39
Responses adjusted for school characteristics:					
Principal talks with me frequently about my instructional practices	2.70	2.67	2.59	2.56	2.49
Principal lets staff know what's expected of them	1.71	1.71	1.66	1.72	1.71
Principal enforces school rules for conduct and backs me up	1.83	1.74	1.69	1.71	1.69
I receive a great deal of support from parents	2.52	2.38	2.44	2.42	2.29
Cooperative effort among staff	1.98	1.77	1.87	1.88	1.85
I make an effort to coordinate content of my courses with other teachers	1.79	1.74	1.77	1.76	1.72
Necessary materials are available as needed by the staff	2.07	1.94	1.93	1.90	1.99
If you could go back to your college days, would you become a teacher again?	2.48	2.40	2.41	2.40	2.41

Notes: Teachers were given four possible responses to select, 1=strongly agree, 2= somewhat agree, 3=somewhat disagree, and 4=strongly disagree, except for the question on choosing to become a teacher again on which they were given six possible responses, 1=certainly would become a teacher, 2=probably would become a teacher, 3=chances about even for and against, 4=probably would not become a teacher, 5=certainly would not become a teacher. See Data and Methods, p. 15, for a description of the regression procedure used to control for school characteristics. The adjusted scores reported here were obtained by setting teacher characteristics, percentage in school lunch program, percentage Black students, and percentage Hispanic students at their sample averages in calculating the regression equation for each geographic area.

Source: Calculated by the authors using data from the Schools and Staffing Survey.

As was the case with the teachers' perceptions of school problems, the adjustment of scores for the effects of school characteristics has little effect on assessments of school organization in any of the geographic areas. The rural-urban differences are not a product of differences in school characteristics by location.

In table 8, we report teachers' assessments of their own influence. The responses to these questions range from 1=none to 6=a great deal, so the higher the score the more influence the average teacher has on the activity. Rural teachers average much more autonomy in the classroom and more influence over school policy. Rural teachers enjoy significantly more control over their classrooms with regard to choice of textbooks, course content, teaching techniques, homework, and discipline. Central city teachers report the lowest influence, and influence steadily increases as the location becomes more rural. Again, adjusting for school characteristics decreases the differences among the geographic areas somewhat but main-

Table 8

Full-time teachers' assessments of their own influence

Rural teachers report more influence over school policies and their own classrooms

Responses	Metro			Nonmetro	
	Central city	Suburb	Small city	Small town	Rural
			Score		
Unadjusted responses:					
At this school, how much influence do you think teachers have over school policy in:					
Establishing curriculum	3.29	3.71	3.59	3.79	3.84
Determining discipline policy	3.47	3.69	3.66	3.73	3.76
At this school, how much control do you feel you have in your classroom over:					
Selecting textbooks and other instructional materials	3.86	4.21	4.10	4.50	4.69
Selecting content, topics, and skills to be taught	4.08	4.34	4.29	4.60	4.77
Selecting teaching techniques	5.16	5.29	5.30	5.36	5.42
Determining the amount of homework to be assigned	5.28	5.33	5.41	5.47	5.54
Disciplining students	4.65	4.85	4.79	4.85	4.93
Responses adjusted for school characteristics:					
At this school, how much influence do you think teachers have over school policy in:					
Establishing curriculum	3.38	3.70	3.58	3.75	3.78
Determining discipline policy	3.56	3.72	3.65	3.69	3.71
At this school, how much control do you feel you have in your classroom over:					
Selecting textbooks and other instructional materials	3.92	4.21	4.10	4.47	4.62
Selecting content, topics, and skills to be taught	4.13	4.33	4.28	4.58	4.70
Selecting teaching techniques	5.22	5.30	5.29	5.34	5.40
Determining the amount of homework to be assigned	5.31	5.35	5.42	5.47	5.52
Disciplining students	4.73	4.87	4.78	4.82	5.47

Notes: Teachers were given six possible responses to select, from 1=none, to 6=a great deal. The adjusted scores were obtained by setting teacher characteristics, percentage in school lunch program, percentage Black students, and percentage Hispanic students at their sample averages in calculating the regression equation for each geographic area. See Data and Methods, p. 15, for definition of county types.

Source: Calculated by the authors using data from the Schools and Staffing Survey.

tains the pattern of increasing influence with increasing ruralness, indicating that differing school characteristics do not account for all of the geographic differences.

Thus, the assessments of teachers suggest that rural schools display many of the critical features identified in the "effective schools" literature (Purkey and Smith). What accounts for this rural advantage? One factor is school size. A significant theme in the recent school reform literature is that larger schools and school districts display diseconomies of scale, which stifle innovation and adaptation in school and classrooms (Walberg and Walberg). Since rural schools are on average smaller than urban schools, do differences in teacher assessments arise from the fact that rural schools are typically smaller than urban schools?

To assess the effect of school size on our findings, we reran the regressions on teacher assessments adding a control for school size. Smaller school size tended to reduce the rural advantage, but on virtually every question a significant rural advantage persisted. Thus, something other than school size and the school characteristics we had initially controlled for accounts for the rural school advantage.

We also explored the question of regional differences in rural effects by reestimating the models including an interaction term for rural southern teachers. This specification divided rural teachers into southern and nonsouthern categories. Southern rural teachers tended to find more problems in the learning environment than did nonsouthern rural teachers. Southern rural teachers tended to be less satisfied with their salaries, resource availability, and class size than their nonsouthern rural counterparts. Not surprisingly, they were also less satisfied with their teaching careers and less likely to report that they would, if given a chance, again choose teaching as a career. On the other hand, they generally reported more input on various aspects of school policy. The rural school advan-

tage is not then as great in the South as elsewhere. Breaking out southern rural teachers makes the contrasts between nonsouthern rural teachers and metro or small town nonmetro teachers stronger. From the teachers' point of view, rural schools outside of the South provide a very attractive learning and teaching environment.

Sources of Rural School Advantages

What factors can account for these rural school advantages? The positive assessments teachers give rural schools may reflect features of rural and small town life rather than schools per se. Schools mirror the communities in which they are situated. If crime and violence are problems in the community, surely they will spill over to the school as well. As one rural educational researcher writes: "Rural communities are still basically homogeneous, stable, and traditional, and rural schools remain essentially an expression of community life" (Dunne, p. 91). Ruralness is probably standing in for positive features of family and community life that we could not control for in our analysis.

While community characteristics that we could not measure may account for some of the rural advantage, they cannot readily explain all of the differences in teacher control, cooperation, and collegiality we identified. The organization and management of schools may also play a part (Sher, Tyack, Nachtigal). Urban and rural schools address the agency problem (that is, how parents and taxpayers induce their agents, the teachers and principals, to serve them effectively) in fundamentally different ways. The approach taken in urban schools is hierarchical and bureaucratic, with decisions regarding textbooks, curricula, teaching methods, and discipline centralized and imposed on all the staff. Rural schools, on the other hand, tend to leave these decisions in the hands of teachers, with teacher performance monitored and motivated by closer ties between the school and the community. Teachers in rural school districts, for instance, are more likely to live in the community served by their school. A recent survey by the National Education Association found that 54.6 percent of teachers in districts with fewer than 3,000 students lived in the attendance area of the school compared with just 16.9 percent of teachers in districts with 25,000 or more students. Thus ineffective teachers cannot as readily escape censure at the end of the day, while effective teachers may find their superior performance continually reinforced. Children of rural school teachers are also more likely to attend the school at which their parents teach. Such close links between the teachers, the principal, the school board, and the community may lessen problems of performance monitoring and motivation that beset all organizations.

Table 9

Full-time high school teachers' time spent in preparation and after school activities, 1987-88

Rural teachers spend more after school hours in activities involving students

	Metro			Nonmetro	
Task	Central city	Suburb	Small city	Small town	Rural
			Hours		
Home preparation, including grading	7.6	7.6	7.6	7.4	7.2
In-school preparation periods	6.1	6.5	6.2	6.1	5.9
After school activities with students	4.0	4.2	4.6	5.0	5.5

Note: See Data and Methods, p. 15, for definition of county types.
Source: Calculated by authors using data from the Schools and Staffing Survey.

This contrast between rural and urban environments is starkly apparent in the way teachers allocate their time. Rural high school teachers spend approximately the same time in class preparation and student evaluation as urban and suburban instructors — indeed, more, if these figures were adjusted for the smaller rural student/teacher ratio. However, there is a striking contrast in the allocation of hours outside school to activities involving students (table 9). Rural instructors average 90 minutes more per week in such activities as coaching, drama, debate, and club sponsorship.

Thus, the relationship between the school and the community is a two-way street, with the school both contributing to and benefiting from the greater sense of community and shared purpose found in rural and small town districts. The following characterization of the nation's Catholic high schools might well be applied to rural school systems:

"[T]he academic structure of Catholic high schools is embedded within a larger communal organization...[A] set of distinctive structural components...enable the community. Chief among these is an extended scope of the role of the teacher. Teachers are not just subject-matter specialists whose job definition is delimited by the classroom walls. Rather, they are mature persons whom students encounter in the hallways, playing fields, in the school neighborhood, and sometimes even in their homes. In the numerous personal interactions that occur among adults and students outside of classrooms, many opportunities are afforded for expressions of individual concern and interest." (Bryk and Lee, p. 20)

Just as the high quality of social interactions between adults and students has been found to contribute to the effectiveness of parochial schools, so it is reasonable to conclude that students in rural school systems also benefit

Data and Methods

The 1987-88 Schools and Staffing Survey (SASS) is a comprehensive survey of approximately 9,300 public and 3,500 private school administrators and about 56,000 public and 11,500 private school teachers at these same schools. SASS contains four survey instruments: a school survey, a district-level survey focusing on teacher demand and shortages, an administrator survey, and a teacher survey. Response rates were quite high for public schools and public school teachers: 92 and 86 percent, respectively (for details on the 1987-88 SASS survey and methodology, see Office of Educational Research and Improvement, U.S. Department of Education, 1992).

The county type classification we use is a modified version of ERS' rural-urban continuum codes (popularly referred to as Beale codes). We collapsed the continuum categories into three metro area types (Central City, Suburb, Small City) and two nonmetro area types (Small Town, Rural).

The continuum categories in each of our types are

Type	Continuum code and definition
Metro:	
Central city	0. Central counties of metro areas of 1 million population or more
Suburb	1. Fringe counties of metro areas of 1 million population or more
Small city	2. Counties in metro areas of 250,000 to 1 million population
	3. Counties in metro areas of less than 250,000 population
Nonmetro:	
Small town	4. Urban population of 20,000 or more, adjacent to a metro area,
	5. Urban population of 20,000 or more, not adjacent to metro area,
	6. Urban population of less than 20,000, adjacent to a metro area,
	8. Completely rural, adjacent to a metro area
Rural	7. Urban population of less than 20,000, not adjacent to a metro area
	9. Completely rural, not adjacent to a metro area.

We needed to group the continuum codes into fewer categories because the SASS sample could not provide highly reliable results for all 10 groups. Although the code 8 counties are completely rural (that is, contain fewer than 2,500 urban residents), we grouped them with the more urban nonmetro counties because their proximity to metro areas appeared to provide a more urban environment. The entire grouping is named "small town" for ease of reporting.

We grouped the somewhat urban, nonadjacent nonmetro counties, code 7, with the rural, nonadjacent nonmetro counties, code 9, because their lack of proximity to metro areas appeared to provide a more rural environment. The entire grouping is named "rural" for ease of reporting.

from the more extensive contacts with their teachers that rural communities foster.

For Further Reading. . .

D. Ballou and M. Podgursky, *Teacher Pay and Teacher Quality*, W. E. Upjohn Institute for Employment Research, Kalamazoo, MI, forthcoming, 1996.

A. Bryk and V. Lee, "Lessons from Catholic High Schools on Renewing Our Educational Institutions," *Network News and Views*, Vol. 12, No. 6, 1993, pp. 18-39.

R. Cole, *Small Schools: An International Overview*, EDO-RC-89-12, ERIC/CRESS Appalachia Educational Laboratory, Charleston, WV, Sept. 1989.

J.E. Chubb and T.M. Moe, *Politics, Markets, and America's Schools*, The Brookings Institution, Washington, DC, 1990.

L. Darling-Hammond, *Beyond the Commission Reports*, R-3177-RC, Rand Corporation, Santa Monica, CA, 1984.

A.J. DeYoung, "The Status of Rural Education Research: An Integrated Review and Commentary," *Review of Educational Research*, Vol. 57, No. 2, Summer, 1987, pp. 123-48.

A.T. Dunathan, "Teacher Shortage: Big Problems for Small Schools," *Phi Delta Kappan*, November, 1980, pp. 205-206.

F. Dunne, "Choosing Smallness: An Examination of the Small School Experience in Rural America," in J.P. Sher (ed.), *Education in Rural America: A Reassessment of Conventional Wisdom*, Westview Press, Boulder, CO, 1977.

N. Friedkin and J. Neochea, "School System Size and Performance: A Contingency Perspective," *Education Evaluation and Policy Analysis*, Vol. 10, No. 3, pp. 237-249.

J. Goodlad, *A Place Called School: Prospects for the Future*, McGraw-Hill, New York, 1984.

D. Hobbs, "Rural School Improvement: Bigger or Better?" *Journal of State Government*, Vol. 61 No. 1, (January/February)1988, pp. 22-28.

D. Hobbs, "Capacity Building: Re-examining the role of the Rural School," in L. Beaulieu and D. Mulkay (eds.), *Investing in People: The Human Capital Needs of Rural America*, Westview Press, Boulder, CO, 1995.

J.G. Horn, *Recruitment and Preparation of Quality Teachers for Rural Schools*, U.S. Department of Education, 1985.

W.W. McMahon and S. Chang, *Geographical Cost of Living Differences: Interstate, Intrastate, Update 1991*, Center for the Study of Education Finance, Illinois State University, Normal, IL, April 1991.

P.M. Nachtigal, *Rural Education: In Search of a Better Way*, Westview Press, Boulder, CO, 1982.

National Center for Education Statistics, U.S. Department of Education, *Digest of Education Statistics, 1993*, Oct. 1993.

National Education Association, *Status of the American Public School Teacher: 1985-86*, Washington, DC, 1987.

Office of Educational Research and Improvement, U.S. Department of Education, *Schools and Staffing in the United States: A Statistical Profile 1987-88*, NCES 92-120, July 1992.

S.C. Purkey and M.S. Smith, "Effective Schools: A Review," *The Elementary School Journal*, Vol. 83, No. 4, March, 1983, pp. 427-52.

S.A. Rosenfeld and Jonathan P. Sher, "The Urbanization of Rural Schools, 1840-1970," in J. P. Sher (ed.), *Education in Rural America: A Reassessment of Conventional Wisdom*, Westview Press, Boulder, CO, 1977.

J.D. Stern, (ed.), *The Condition of Education in Rural Schools*, U.S. Department of Education, June 1994.

D. Swift, Finding and Keeping Teachers: *Strategies for Small Schools*, ERIC Clearinghouse on Rural Education and Small Schools, Las Cruces, NM, Sept. 1984.

D. Tyack, *The One Best System: A History of American Urban Education*, Cambridge, MA, 1974.

H.J. Walberg and H.J. Walberg III, "Losing Local Control," *Educational Researcher*, Vol. 23, No. 5, June-July 1994, pp. 19-26.

Elizabeth J. Greenberg and Ruy A. Teixeira

Nonmetro Student Achievement on Par with Metro

Nonmetro 17-year-old students score only slightly lower than metro students in reading and mathematics and at the same level as metro students in science. While Southern scores are consistently lower than for the other regions (where nonmetro scores are frequently higher than metro scores), Southern nonmetro scores have been improving faster than scores in any other region and, in 1992, converged with Southern metro scores. Finally, we compare availability of advanced courses between metro and nonmetro schools and find that rural schools do not provide the advanced curriculum that urban schools do.

THE 1980's witnessed a troubling divergence of economic outcomes between metro and nonmetro areas, despite the fact that educational attainment levels in rural areas are much closer to urban levels than they were several decades ago. This divergence included slower employment growth, higher unemployment, relative and absolute earnings deterioration, higher levels of underemployment, relative decline in nonmetro per capita income and higher poverty rates, trends that accentuated the basic rural-urban gap in economic conditions. And even in the early 1990's, when economic trends have been more favorable in rural areas, these gaps remain largely unchanged.

One common explanation for these problems is that, despite increased years of schooling for rural workers and the marked convergence of high school completion rates, rural students still receive an inferior education. In other words, the quantity of schooling rural workers receive has shot up, but the quality of that education remains exceptionally poor. This means that rural schools do not adequately prepare their students for the requirements of modern jobs and therefore—the argument runs—companies locate elsewhere, lowering employment opportunities and wages in nonmetro areas.

We examine this hypothesis that rural education is markedly inferior by looking at the educational achievement of nonmetro 17-year-olds, the cohort that is preparing to enter the labor market or continue on to college. Using data available from the National Assessment of Educational Progress (NAEP), we compare test scores of nonmetro 17-year-olds to those of metro 17-year-olds both at the present time and over the past two decades (See Data, Definitions, and Methods, p. 22, for a description of the NAEP data). Contrary to the hypothesis, nonmetro students score only slightly lower than metro students in reading and mathematics and at the same level as metro students in science. We also compare availability of advanced courses between metro and nonmetro schools and find that rural schools do not provide the advanced curriculum that urban schools do.

In addition to comparing metro versus nonmetro, which are quite broad categories, we break the data down into finer categories based on proximity to cities and size of population (the ERS rural-urban continuum familiarly referred to as Beale codes). The only groups scoring consistently below average are metro inner cities and a combination of two continuum codes comprised of nonmetro counties that are adjacent to metro areas but have no or few (less than 20,000) urban residents of their own. We also look at regions and show that while scores are consistently lower in the South than in other regions (where nonmetro scores are frequently higher than metro scores), Southern nonmetro scores have been improving faster than scores in any other region, and, in 1992, converged with Southern metro scores. Finally, we show that minorities and the lowest scoring 20 percent of students

Elizabeth Greenberg is a social science analyst at Washington State University at Pullman. Ruy Texiera is a sociologist in the Rural Economy Division, ERS.

are improving performance faster than Whites and the highest scoring 20 percent of students.

Average Educational Achievement Improved, 1975-92

Comparing metro and nonmetro NAEP scores for 1992, the most recent year for which we have data, we can see very little difference between the two groups (table 1). Nonmetro students score slightly higher in science, while metro students score slightly higher in math and reading, but none of the differences are statistically significant.

Looking at the historical scores, the differences in achievement level between metro and nonmetro students have been modest throughout the 1980's, though generally slightly larger in earlier years than in the current era. Thus, although economic conditions have diverged over this period, there has been some minor convergence of scores between metro and nonmetro areas, rather than a divergence.

A simple comparison of metro and nonmetro scores, therefore, indicates that there is little to worry about with regard to nonmetro student achievement. In fact, there appear to be grounds for optimism with regard to the accomplishments of nonmetro students and nonmetro schools when compared with metro students and metro schools.

However, the categories metro and nonmetro are so broad that they could cover up significant problems with some schools and students. For example, rural schools in the South may vary from nonmetro norms, given what we know about the low economic status of much of the rural South.

Table 1

Average achievement scores of 17-year-olds by residence, 1975-92

Nonmetro achievement scores are only slightly lower than metro achievement scores and the differences have been getting smaller over the past 15 years

Subject/area	1975	1980	1988	1990	1992
Reading:					
Metro	286.0	286.3	292.4*	290.9	290.6
Nonmetro	283.5	282.8	285.4*	288.0	287.1
	1978	1982	1986	1990	1992
Mathematics:					
Metro	301.6*	299.8*	303.1*	304.6	307.4
Nonmetro	297.4*	294.7*	299.1*	304.1	304.1
	1977	1982	1986	1990	1992
Science:					
Metro	290.0	283.4	288.3	289.6	293.7
Nonmetro	287.5	284.7	288.8	291.7	293.7

*Metro-nonmetro difference is significant at the 95-percent level of confidence.

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

Both Metro and Nonmetro Students in the South Score Lower than Students in Other Regions

Separating students by regions, we see substantial variations among region/metro status categories. Southern students, in particular, score consistently lower than other

Table 2

Average achievement scores of 17-year-olds by region and residence, 1975-92

Southern scores lag the rest of the country, but Southern nonmetro scores have improved, catching up with Southern metro scores by 1992

Subject/area	1975	1980	1988	1990	1992
Reading:					
Northeast—					
Metro	291.4	285.9	296.1	293.9*	298.8
Nonmetro	287.9	281.8	292.4	304.1*	**
Midwest—					
Metro	290.2	287.1	292.3	294.2	293.7
Nonmetro	293.1	289.1	292.2	291.3	293.9
South—					
Metro	278.6*	282.9	292.6*	289.1*	280.5
Nonmetro	270.6*	276.1	278.0*	278.1*	279.6
West—					
Metro	284.4	290.7	286.4	286.8	294.5
Nonmetro	282.3	281.4	**	297.8	292.8
	1978	1982	1986	1990	1992
Mathematics:					
Northeast—					
Metro	305.6	304.3	304.9	301.1	312.3
Nonmetro	308.5	**	308.8	306.9	**
Midwest—					
Metro	306.4	303.6	304.4	311.0	313.2
Nonmetro	302.6	298.3	301.2	312.1	309.4
South—					
Metro	295.7	293.6	302.7*	304.0*	301.4
Nonmetro	290.5	287.5	296.5*	296.6*	299.7
West—					
Metro	295.5	295.4	299.3	300.8*	305.2
Nonmetro	296.9	297.5	295.4	312.6*	305.9
	1977	1982	1986	1990	1992
Science:					
Northeast—					
Metro	295.4	283.1	287.7	288.4*	301.3
Nonmetro	297.2	**	300.1	303.7*	**
Midwest—					
Metro	293.4	290.0	293.8	298.3	304.7
Nonmetro	296.8	288.6	296.2	303.5	303.5
South—					
Metro	282.9*	278.1	288.3	286.3*	279.9
Nonmetro	272.5*	275.4	284.7	278.9*	285.1
West—					
Metro	287.3	280.8	280.9	284.8	296.0
Nonmetro	293.8	290.2	276.6	298.6	298.3

*Metro-nonmetro difference is significant at the 95-percent level of confidence for a given year in a given region.

**Insufficient number of cases to accurately compute statistic.

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

students (table 2). However, within the South, the scores of nonmetro students improved significantly over time in all three subjects, almost closing the gap with metro Southerners in reading and math and exceeding the achievement of metro Southerners in science. But this is convergence at a relatively low level, since both Southern nonmetro and metro students in 1992 still scored 5 to 10 points below the national mean in all three subjects. No other geographic group had scores that low.

Looking at the other regions, students in the nonmetro West achieved the biggest improvement in reading and math test scores. Note, however, their scores in these subjects dropped by 5 and 7 points, respectively, from 1990 to 1992, a change with no obvious explanation, although sample selection differences between the 2 years may be a factor. Even with that drop in scores, students in the nonmetro West have greatly improved their scores in all three subjects since 1975.

In the Northeast, nonmetro scores declined slightly over time in math and increased in reading and science, while metro scores increased in all three subjects (although they decreased for several years in science before beginning to increase). By 1990, in the Northeast, nonmetro students did better than metro students in all three subjects, with nonmetro advantages of over 10 points in reading and science. At least in the Northeast, the test scores indicate that rural students are not disadvantaged in schooling.

Achievement patterns in the Midwest were more mixed. Nonmetro students' scores improved significantly in science and math, while they remained stable in reading. Looking at 1992, nonmetro students in the Midwest scored slightly lower than metro students in math and science, but almost identically in reading. Even the math and science differences are not statistically significant, suggesting that nonmetro students are receiving an education comparable to that of metro students in the region.

Size and Location of Nonmetro Areas Have Small Impact on Student Scores

We also looked to see if the size or location of nonmetro areas has a significant impact on students' achievement. Only two categories score consistently below the national mean—metro central cities and rural, adjacent nonmetro areas (table 3). Even these deviations are not large and the overall amount of variation among categories appears surprisingly small. The largest difference between areas by level of urbanization was 25 points in 1992 (between metro suburban students and nonmetro students in nonadjacent, urbanized areas) and most differences were considerably smaller than that.

Levels of educational achievement have converged, not diverged, among the groups of rural and urban areas.

Table 3

Average achievement scores by rural-urban continuum, 1975-92

Only students in metro central city and nonmetro small town counties consistently scored below the national average

Subject/area	1975	1980	1988	1990	1992
Reading:					
United States	285.6	285.5	290.1	290.2	289.7
Metro–					
Central city	279.1	283.0	291.1	284.5	282.5
Suburb	294.1	292.0	293.0	295.9	299.8
Medium	287.3	286.5	295.3	293.1	292.0
Small	286.9	282.7	291.7	290.7	289.5
Nonmetro–					
Urban, adjacent	289.5	286.5	293.3	289.0	290.5
Urban, nonadjacent	287.8	287.2	285.2	298.3	279.1
Rural, adjacent	278.4	278.0	282.2	285.6	280.7
Rural, nonadjacent	284.0	281.7	283.4	285.8	291.4
	1978	1982	1986	1990	1992
Mathematics:					
United States	300.4	298.5	302.0	304.6	306.7
Metro—					
Central city	300.4	295.4	300.4	299.1	301.8
Suburb	301.7	310.1	306.8	309.3	314.5
Medium	305.4	299.1	304.9	306.6	306.2
Small	298.5	291.6	297.2	307.3	310.0
Nonmetro–					
Urban, adjacent	300.6	295.6	306.5	309.2	305.2
Urban, nonadjacent	297.8	299.6	300.8	305.8	296.2
Rural, adjacent	294.0	294.8	297.1	299.8	303.3
Rural, nonadjacent	297.1	292.5	295.8	305.0	306.7
	1977	1982	1986	1990	1992
Science:					
United States	289.5	283.3	288.5	290.4	294.1
Metro–					
Central city	288.1	273.9	283.7	277.5	283.5
Suburb	297.3	297.2	295.9	298.2	303.7
Medium	288.5	283.7	287.9	294.9	292.7
Small	289.6	281.2	284.0	295.7	303.2
Nonmetro–					
Urban, adjacent	296.9	283.7	293.5	298.1	297.2
Urban, nonadjacent	272.5	290.2	286.6	296.8	279.3
Rural, adjacent	284.6	282.7	288.1	284.9	290.7
Rural, nonadjacent	285.8	284.5	288.9	292.8	297.9

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

Achievement differences among them, not even large in 1975, are now quite small and statistically insignificant in most cases. This convergence suggests that, while inferior education of nonmetro high school graduates, particularly those in the most rural counties, may once have been a partial explanation for the failure of businesses to locate in nonmetro areas, it cannot be viewed as involved in the continuing problems of rural development during the 1980's and early 1990's.

Minorities Score Lower than Whites, But Making Large Gains

One could still argue, however, that the aggregate results summarized in the previous section mask important trends among subgroups that deter rural development, at least among certain populations. For example, achievement trends among nonmetro minorities may be lagging those among nonmetro Whites, thereby threatening development prospects precisely where they are needed most. [For more information on the situation of rural minorities, see the forthcoming ERS monograph, L. Swanson, editor.]

Test scores show, however, that minority achievement, rather than being a source of concern, is a source of optimism. Among nonmetro Blacks, for example, average reading scores rose from 236 in 1975 to almost 258 in 1992, an increase of 22 points (table 4). In contrast, average reading scores among nonmetro Whites stagnated, rising only 1 point, from 290 to 291. Thus, instead of widening, the rural White-Black reading achievement gap substantially narrowed over time.

This basic story is repeated in mathematics and science. Thus, nonmetro minorities, far from being left behind by achievement trends, are actually making more progress than their White counterparts. However, minority, especially Black, test scores still lag White test scores, and this could be a source of development problems in areas with high concentrations of minorities.

Test Score Improvement Greatest for Lowest Achieving Students

Aggregate nonmetro achievement trends may also be masking differential trends at the bottom and top of the achievement distribution. For example, the modest aggregate nonmetro gain in achievement levels may include a substantial fall in achievement by the bottom 20 percent of students, counterbalanced by a strong gain in achievement among the top 20 percent of students. This could create problems for development if the highest achieving students are more likely to leave nonmetro areas to attend college, leaving behind a work force whose achievement levels are getting worse.

Counter to that hypothesis, average test scores show the biggest gains made by those at the bottom of the distribution. In math, for example, achievement at the 20th percentile rises from 268 in 1978 to 280 in 1992, a gain of 12 points (table 5). In contrast, achievement at the 80th percentile rises only from 327 to 329 over the time period, a gain of 2 points. Similar trends occurred in reading and science—the bottom is rising faster than the top, thereby

Table 4

Average achievement scores by race, ethnicity, and residence, 1975-92

Black scores show significant gains, but still lag White scores

Item	1975	1980	1988	1990	1992
Reading:					
White–					
Metro	293.6*	294.6*	297.2*	299.3*	299.7
Nonmetro	290.2*	287.3*	290.8*	291.7*	291.1
Black–					
Metro	240.0	244.4	278.9*	267.9	261.3
Nonmetro	236.2	234.4	256.3*	258.7	257.6
Hispanic–					
Metro	249.9	260.4	272.8	273.4	268.0*
Nonmetro	**	265.8	260.2	280.9	282.1*
Other–					
Metro	261.2	280.8*	285.5	289.9	287.1
Nonmetro	259.2	259.9*	308.8	279.9	**
	1978	1982	1986	1990	1992
Mathematics:					
White–					
Metro	307.6*	306.0*	309.4*	311.2*	313.0*
Nonmetro	301.4*	298.0*	302.3*	306.0*	308.5*
Black–					
Metro	269.3*	273.2*	279.6	287.3	286.3
Nonmetro	262.0*	264.2*	279.8	290.5	275.4
Hispanic–					
Metro	276.5	275.9*	281.8*	282.0*	291.2
Nonmetro	273.0	282.4*	293.2*	293.4*	296.6
Other–					
Metro	316.8	310.3	319.4*	314.4	320.6*
Nonmetro	302.6	295.3	285.5*	311.8	303.4*
	1977	1982	1986	1990	1992
Science:					
White–					
Metro	298.6*	294.3	297.9	302.3	305.6
Nonmetro	294.5*	291.2	295.9	297.6	299.5
Black–					
Metro	242.0*	236.4	253.3	253.3	255.7
Nonmetro	234.2*	237.1	249.7	251.8	252.3
Hispanic–					
Metro	262.3	248.0	258.5	260.7	261.3*
Nonmetro	259.7	251.5	273.5	271.6	286.9*
Other–					
Metro	291.6*	269.0	298.2*	293.3	286.0
Nonmetro	273.5*	265.8	244.7*	281.5	299.2

*Metro-nonmetro difference is significant at the 95-percent level of confidence for a given year in a given region.

**Insufficient number of cases to accurately compute statistic.

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

narrowing, not widening, the differences among nonmetro students.

Smaller Nonmetro Schools Offer Fewer Advanced Courses

Although the achievement levels of rural students are converging with those of urban students, rural schools still look different from urban schools. Nonmetro high schools are significantly smaller than metro high schools, and, on average, offer fewer advanced college preparatory classes (for more on school characteristics, see Ballou and Podgursky's article, pages 6-16).

During 1992, 27 percent of nonmetro students attended high schools with 400 or fewer students. Only 7 percent of metro students attended high schools that small. Conversely, 35 percent of metro students attended schools with 1,500 or more students, while only 6 percent of nonmetro students were in schools that large.

The importance of school size is a subject of considerable debate in the education literature at the present. However, it is clear from our data that smaller schools lack the resources to offer as many advanced courses as larger schools. For example, in 1992, only 61 percent of students in schools with 400 or fewer students had the opportunity to take calculus. But, when school size jumps to 1,000 or more students, 94 percent of students have the opportunity to take calculus. Similar patterns by school size, though measured in earlier years, exist in the availability of advanced science and other advanced placement courses.

Because of their relatively small size, nonmetro schools offer substantially fewer advanced classes than metro schools (table 6). This is true for all subjects, from English to calculus to chemistry. Note however that NAEP data suggest school size may be only a partial explanation for the gap in course offerings between metro and nonmetro schools. That is, controlling for school size does not always eliminate this gap.

For example, in 1990, only 17 percent of students in nonmetro schools with 400 or fewer students had the opportunity to take calculus compared with 63 percent of metro students in schools of the same size. Similarly, almost all metro students in schools with more than 1,000 students had the opportunity to take calculus (96 percent), but only 61 percent of nonmetro students in schools of this size had that opportunity.

In contrast, the 1992 data on calculus availability show little metro-nonmetro difference in calculus availability by school size. Given the improbability of this pattern changing so drastically in 2 years, we are inclined to believe the truth lies somewhere between the two measures.

Table 5

Average nonmetro achievement scores by percentile ranking of students, 1975-92

Test scores show that the biggest gains in achievement over the past 15 years have been made by students in the lowest percentiles

Subject	1975	1980	1988	1990	1992
Reading:					
20th	247.9	251.6	253.5	254.7	251.7
40th	275.3	274.7	276.9	279.7	279.0
60th	296.6	294.3	295.9	300.7	299.1
80th	320.4	316.5	316.8	322.8	320.2
	1978	1982	1986	1990	1992
Mathematics:					
20th	268.0	268.7	276.3	278.4	280.2
40th	288.3	286.4	291.3	296.6	296.8
60th	306.6	302.3	305.4	312.0	312.3
80th	326.8	322.1	321.8	328.8	329.2
	1977	1982	1986	1990	1992
Science:					
20th	251.4	247.0	254.3	256.3	258.0
40th	277.5	275.2	280.1	281.9	286.3
60th	299.4	297.2	299.7	304.1	305.8
80th	325.1	323.2	324.5	327.2	328.7

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

Table 6

Share of 12th grade students enrolled in schools that offer advanced curricula

More students in metro schools than in nonmetro schools have the opportunity to take advanced classes.

Advanced courses	Metro	Nonmetro
	Percent of all 12th graders	
In schools that offered:		
Advanced placement courses in 1988:		
American government	21.8*	6.6*
American history	57.3*	23.1*
English language	54.1*	29.5*
English literature	59.9*	24.6*
Second-year courses in 1990:		
Biology	75.1	68.3
Chemistry	62.2*	44.6*
Physics	32.9*	7.5*
Calculus in 1992	91.9*	67.1*

Note: Standard errors are in parentheses.

*Metro-nonmetro difference is significant at the 95-percent level of confidence.

Source: Calculated by authors using survey data from National Assessment of Educational Progress.

Data, Definitions, and Methods

The data in this paper come from the National Assessment of Educational Progress (NAEP), a survey of the cognitive achievement levels of 9-, 13-, and 17-year-old students across the United States. The survey started in 1970 and was conducted irregularly for the first few years, sometimes annually, sometimes biennially. Since 1978, the NAEP survey has been done regularly every other year.

The NAEP is the only existing data set which allows regular, statistically valid comparisons of achievement levels of students in the United States. Up to 100,000 students are tested during each survey year, distributed so that 4,000-6,500 students are tested in a given subject at each of the three age levels. Because our main interest is in the quality of the rural workforce, we focused our analysis on the 17-year-olds in the data set—the next cohort to be entering the workforce.

The data go back to 1975 for reading, 1977 for science, and 1978 for math. We were unable to use the earliest NAEP surveys because we could not obtain county identifiers for the students which would allow us to make metro-nonmetro comparisons.

For the later years of the survey, 1986-1992, we used the "bridge" samples rather than the main samples of students. Beginning in 1986, when the Educational Testing Service (ETS) took over the administration of the NAEP, the procedures used to administer the test, the time of year the test was given, and the way students' ages were measured were all changed. To allow comparison of the data with earlier years, ETS included a bridge sample in each survey in which the test was conducted as it had been originally.

NAEP scores for the 17-year-olds in this study range from approximately 100 to 400. The meaning of the scores is as follows:

Reading:
150—Can carry out simple, discrete reading tasks.
200—Can comprehend specific or sequentially related information.
250—Can search for specific information, interrelate ideas, and make generalizations.
300—Can find, understand, summarize, and explain relatively complicated information.
350—Can synthesize and learn from specialized reading materials.
Mathematics:
150—Knows some addition and subtraction facts.
200—Can add and subtract two-digit numbers and recognizes relationships among coins.
250—Can add, subtract, multiply, and divide using whole numbers, and solve one-step problems.
300—Can compute with decimals, fractions, and percents; recognize geometric figures; solve simple equations; and use moderately complex reasoning.
350—Can solve multi-step problems and use beginning algebra.
Science:
150—Knows everyday science facts.
200—Understands some simple principles and has some knowledge, for example, about plants and animals.
250—Understands and applies general information from the life and physical sciences.
300—Has some detailed scientific knowledge and can evaluate the appropriateness of scientific procedures.
350—Can infer relationships and draw conclusions using detailed scientific knowledge.

We used the ERS rural-urban continuum codes (familiarly the Beale codes) to study differences among student scores by the level of urbanization of their home counties. We combined the four least urban nonmetro groups into two groups because the NAEP sample was too small to produce reliable results for each of the groups separately. We analyzed the following groups:

Code	Name	Description
Metro		
0	Central city	Central counties of metro areas of 1 million population or more
1	Suburb	Fringe counties of metro areas of 1 million population or more
2	Medium	Counties in metro areas of 250,000 to 1 million population
3	Small	Counties in metro areas of less than 250,000 population
Nonmetro		
4	Urban, adjacent	Urban population of 20,000 or more and adjacent to a metro area
5	Urban, nonadjacent	Urban population of 20,000 or more and not adjacent to a metro area
6 and 8	Rural, adjacent	Urban population of less than 20,000 or no urban population and adjacent to a metro area
7 and 9	Rural, nonadjacent	Urban population of less than 20,000 or no urban population and not adjacent to a metro area

Metro and nonmetro status is that announced by the Office of Management and Budget in June 1983, when population and commuting data from the 1980 Census of Population became available. We chose to collapse the last four continuum codes by adjacency rather than level of urban population because the heavy reliance of the adjacent counties' workers on commuting to work in metro counties appears to distinctly differentiate them from the nonadjacent counties (Ghelfi and Parker). Although these counties may have up to 19,999 urban residents, many of them have little or no urban population so we call them "rural, adjacent" and "rural, nonadjacent," for simplicity.

Whatever the reasons for the gap in the availability of advanced courses, the fact remains that it is there. Indeed, it could be an important reason why rural students, despite their comparable academic achievement levels, are substantially less likely to attend college (see Gibbs' article on pages 35-44). To address this situation, some rural school districts are using distance learning via telecommunications to get advanced courses into their high schools. Increasing rural students' access to advanced courses via telecommunications or other means may be one of the last and most difficult hurdles remaining in getting rural educational opportunities up to par with urban opportunities.

Conclusion

These findings suggest that an education-based explanation for rural development problems should be viewed skeptically. Not only have years of schooling increased dramatically for rural workers, but the quality of that schooling actually improved relative to urban areas, so that educational achievement in rural and urban areas is now roughly equal. This raises the possibility that the most serious skill obstacles to rural development may be on the demand side, that is, in creating jobs that demand more highly skilled workers. This seems especially plausible in light of recent research indicating that the availability of high-skill jobs in rural areas has been poor and that availability of those jobs has little to do with local educational levels (McGranahan and Ghelfi, Teixeira and Mishel, and McGranahan).

Is more and better education completely useless then? No, for two reasons. First, more and better education can help individuals in rural areas. Second, if economic circumstances change, rural areas could benefit substantially from improving the education of the workforce. For example, the U.S. economy could move onto a "high-skill, high-wage" path during the late 1990's—thereby substantially increasing skill demand—instead of continuing its lower skill economic course of the 1980's and early 1990's. In such circumstances, public policies might include efforts to help set up the information infrastructure needed to support relatively high-skill industries in rural areas. But whatever the specifics, supporting the development of high-skill jobs in rural areas would be as important as educational improvement strategies.

For Further Reading. . .

L.M. Ghelfi and T.S. Parker, "A New County-Level Measure of Urban Influence," paper presented at the Rural Sociological Society annual meetings, Arlington, VA, Aug. 18, 1995.

E.J. Greenberg, P.L. Swaim, and R.A. Teixeira, "Can Rural Workers Compete for the Jobs of the Future?" *Agriculture's Changing Horizon: Outlook '93 Proceedings*, U.S. Department of Agriculture, 1993, pp. 919-930.

D.A. McGranahan and L.M. Ghelfi, "The Education Crisis and Rural Stagnation in the 1980's," in *Education and Rural Development: Rural Strategies for the 1990's*, AGES-9153, USDA-ERS, Sept. 1991, pp. 40-92.

D.A. McGranahan, "Local Educational Levels and Manufacturing Employment," paper presented at the Rural Sociological Society annual meeting, Arlington, VA, Aug. 18, 1995.

L.R. Mishel and R.A. Teixeira, *The Myth of the Coming Labor Shortage: Jobs, Skills and Incomes of America's Workforce 2000*, Economic Policy Institute, Washington, DC, 1991.

J. Stern, *The Condition of Education in Rural Schools*, U.S. Department of Education, Office of Educational Research and Improvement,1994.

L. Swanson, ed., *The Condition Of Rural Minorities, 1980-1990*, USDA-ERS, forthcoming Rural Development Research Report.

R.A Teixeira, "Rural Education and Training: Myths and Misconceptions Dispelled," in E.N. Castle, ed., *The American Countryside: Rural People and Places*, University Press of Kansas, Manhattan, KS, forthcoming.

R.A. Teixeira and L. Mishel, "Upgrading Workers' Skills Not Sufficient to Jump-start Rural Economy," *Rural Development Perspectives*, Vol. 7, No. 3, June-Sept. 1991, pp. 19-24.

R.A. Teixeira and L. Mishel, *The Myth of the Coming Labor Shortage in Rural Areas*, Economic Policy Institute, Washington, DC, 1992.

R.A. Teixeira and L. Mishel, "Whose Skills Shortage—Workers or Management?" *Issues in Science and Technology*, Vol. 9, No. 4, Summer 1993, pp. 69-74.

R.A. Teixeira and L. Mishel, "Skills Shortage or Management Shortage?" in D. Bills, ed., *The New Modern Times: Factors Reshaping the World of Work*, SUNY Press, Albany, NY, 1995, pp. 193-205.

Kathleen M. Paasch and Paul L. Swaim

More Rural Students Are Graduating From High School, But a Serious Dropout Problem Remains

The nonmetro dropout rate fell sharply between 1975 and 1993, closing the nonmetro-metro gap in high school completion, but only narrowing the nonmetro-suburban gap. Despite these gains, more than 10 percent of rural young people still do not finish high school and face bleak employment prospects. Low parental education and family income are the biggest barriers to reducing the rural dropout rate. High school students also appear to have unrealistic educational and occupational aspirations that may indicate a serious disconnection between school and work.

GRADUATING from high school is an important stage in the preparation for adult life. Secondary education provides a core of knowledge and competencies that are preconditions for performing well on many jobs and at other important activities, such as participating in the political process or being an informed consumer of health care. The decline in the inflation-adjusted wages of high school dropouts since the early 1970's is sobering testimony to the increased importance of finishing high school to individuals' life prospects.

In the last several decades, the share of nonmetro youths who drop out of high school has fallen sharply, largely erasing what had been a substantial nonmetro-metro gap in high school graduation rates. According to data from the Current Population Survey, 16.8 percent of nonmetro 16- to 24-year-olds were dropouts in 1975, only a little higher than the 15.7 percent dropout rate in central cities but much higher than the 10.2 percent rate in other—predominantly suburban—metro areas (fig. 1). By 1993, the nonmetro dropout rate had fallen to 11.1 percent and was intermediate between the 16.8 percent central city and 9.3 percent suburban rates. The long valid generalization that rural educational attainment lags urban now must be greatly qualified. As far as secondary education is concerned, nonmetro students are approximately as likely to earn a high school diploma as all metro students, although suburban students continue to have a lower dropout rate than either nonmetro or central city students.

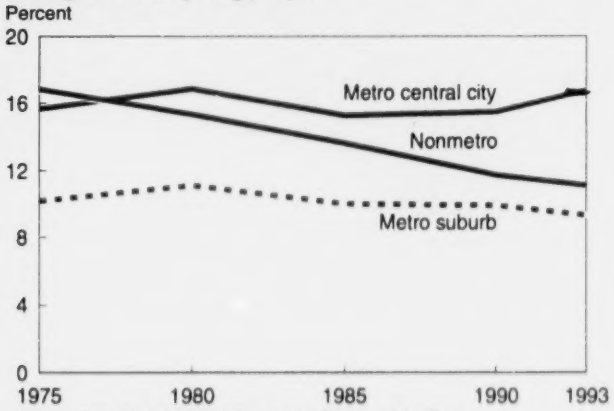
The dramatic improvement in rural dropout rates is good news for rural communities and students, but this good news is subject to several qualifications. First, more than 10 percent of rural high school students still fail to graduate by age 24 and this group may face a rather bleak future. The improvement in rural dropout rates also need not mean that the rural workforce is now competitive in terms of attracting firms who demand well-educated workers. Much of the adult workforce left school when rural dropout rates exceeded urban, with the result that 29 percent of the nonmetro population age 25 or older are high school dropouts, compared with 20 percent of metro adults. Lower dropout rates for new cohorts of rural workers are slowly erasing the rural deficit in secondary education, but progress is slow. Another potential concern is that the quality of rural education might be low, or have fallen as more marginal students were retained in the classroom. Greenberg and Teixeira's analysis of achievement test scores provides strong evidence that this is not the case (see their article on pages 17-23). Finally, rural college attendance continues to lag urban, even among new cohorts (see Gibbs' article on pages 35-44). Despite these cautions, the decline of rural dropout rates is a very positive social development.

Kathleen Paasch is a research associate in the Department of Sociology, Washington State University, Pullman, and Paul Swaim is an economist at the Organization for Economic Cooperation and Development, Paris, France.

Figure 1

Dropout rates for 16- to 24-year-olds by residence

The dropout rate fell most strongly and consistently among nonmetro young people

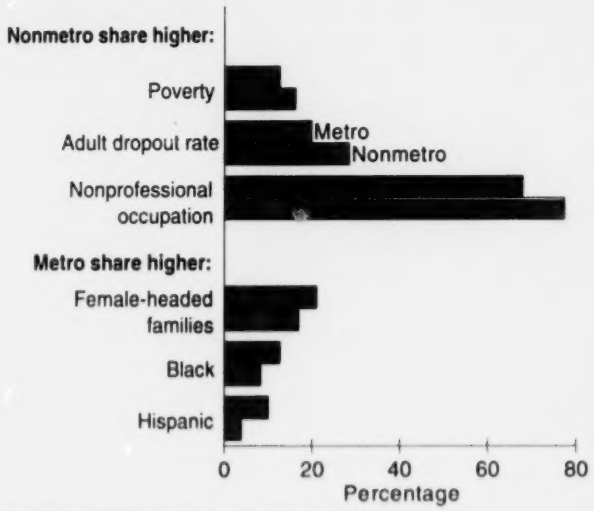


Source: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, Series P-60, various years.

Figure 2

Share of population with potential risk factors, 1980

Nonmetro schools face a different mix of students who may need extra help to stay in school



Source: Calculated by ERS using data from the 1990 Census of Population.

Dropping Out Reflects a Complex Mix of Personal and Community Factors

Previous research has identified a number of risk factors that increase the probability of dropping out (Ashtone and McLanahan). For example, children from families with incomes below the poverty line, with poorly educated parents, or headed by single mothers are more likely to drop out, as are Black and Hispanic children. Data from the 1990 Census of Population indicate that nonmetro children are more exposed to some of these risks than metro children, but less exposed to others (fig. 2). Nonmetro children are more often poor and more often have parents who are themselves dropouts, but are less likely than metro children to be raised by a single-mother or to be Black or Hispanic. The incidence of these risk factors shows that "at-risk" students in rural schools confront a different mix of potential stumbling blocks than their urban and suburban counterparts.

Community and area characteristics have not received nearly as much attention as demographic and family characteristics in prior research on the causes of dropping out. "Neighborhood" effects may, however, be an important part of the dropout problem and necessary for understanding how the rural dropout problem differs from the urban. Coleman hypothesizes that children are more likely to conform to social norms, such as completing high school, in communities in which parents' efforts to encourage such behavior are reinforced by other adults who take an active interest in the welfare of the community's children. This effect on children is called social capital because the reinforcing effect of the community on positive behavior adds to the children's ability to succeed in life. The greater social cohesion sometimes attributed to rural life suggests that rural communities may provide more social capital. For example, Ballou and Podgursky's analysis of rural schools suggests that rural students benefit from more effective integration of schooling into the broader life of the community (see their article on pages 6-16).

Characteristics of the local labor market may also have an important influence on the dropout problem. If few professional and technical jobs are available for local workers, as is the case in most rural labor markets, youths may be less likely to aspire to such careers and, hence, place a lower priority on education. The incentive to persist in school is reduced because the additional earnings that potentially follow from more schooling are not often attainable in the local community. This lack of economic incentive is particularly strong for those who want to remain in their home communities. For those willing to move to areas with higher income employment opportunities, the local disincentive to invest in education is not a strong factor in their risk of dropping out. At the social level, the scarcity of professional adults also provides few role models for rural youth to identify with and aspire to emulate. Our tabulations of data from the 1990 Census of Population indicate that dropout rates vary by the economic specializations of nonmetro counties, suggesting that area differences in labor markets may influence school attainment.

New Data Provide Additional Insights into the Rural Dropout Problem

We use data from the National Education Longitudinal Study (NELS) of 1988, including data from the 1990 and 1992 follow-up interviews, to extend previous research on rural dropouts (see Data and Methods, pp. 33 -34), for a description of the NELS data). Our overall purpose is to analyze the social and economic processes leading to school failure.

We explore the age at which students drop out because of its importance for a significant minority of rural students in the 1990's. We are particularly interested in identifying commonalities and differences in the causes of dropping out among rural, urban, and suburban students. These three community types differ by average education level, earnings, employment opportunities, and family structure, and the students who drop out of school in each area will probably also differ from the dropouts in the other areas in the processes leading to school failure.

The richness of the NELS data allows us to consider several issues that most earlier studies have not addressed. For example, we can distinguish dropouts by when, between the 8th and 12th grades, they stopped attending school. The age at which students drop out is of potential importance for policy because younger dropouts probably experience greater labor market disadvantage. Different processes may be at work at different ages. For example, younger students' decisions whether to persist in school may be more influenced by their families' characteristics, while older students may be more influenced by labor market opportunities. If such differences are substantial, programs geared towards dropout prevention in eleventh grade may provide little in the way of support for potential ninth-grade dropouts. The NELS also included data on students' occupational and educational aspirations, which offer additional insights into schooling outcomes.

In addition to the individual and family risk factors for dropping out, which were emphasized in most previous studies, we also investigate the effects of school environment and labor market and social conditions in the surrounding community on dropping out. Such an analysis is necessary to distinguish, for example, whether students from poor families more often experience school failure due to the deprivations experienced at home or because they attend poor schools or live in areas with poor employment prospects, factors that would also affect even those fellow students whose families were more prosperous. Or, turning the example around, does a shortage of good jobs locally increase the dropout risk for all students or only for students whose families are poor because their parents have not found good jobs and earn little?

Dropout Rates Are Significant, Even as Early as the 10th Grade

According to the NELS, national dropout rates are 6.0 percent for younger students and 6.7 percent for older students (table 1 and see "Data and Methods," pp. 33-34, for our definition of dropouts). The rates for rural students are a little higher in the younger group at 6.3 percent and quite a bit higher in the older group at 8.1 percent. Suburban dropout rates are the lowest in both groups. Urban students are somewhat more likely than rural students to drop out at younger ages, while older rural students are more likely than their urban counterparts to drop out. Consistent with the Current Population Survey data for 16-24 year olds, rural schools have a substantial dropout problem, which is more severe than in suburban schools.

We were initially concerned there would be too few dropouts between 8th and 10th grades to support statistical analysis, because 16 is the legal age to leave school in most States. But dropping out during the early years of high school is not such an uncommon occurrence as might be expected. Many early dropouts have been held back for one or more grades making them legally old

Table 1

Sample sizes and dropout rates

Quite a few students drop out early in high school

Item	Unit	United States	Rural	Urban	Suburban
Younger students, 8th-10th grades, 1988-90:					
Sample size	Number	17,424	5,576	4,495	7,353
Dropout rate	Percent	6.0	6.3	7.7	4.8
Older students, 10th-12th grades, 1990-92:					
Sample size	Number	16,749	5,285	4,653	6,811
Dropout rate	Percent	6.7	8.1	6.6	5.5

Note: See Data and Methods, pp. 33-34, for definition of dropouts.
Source: Calculated by authors using data from the National Education Longitudinal Survey.

enough to leave school. Others appear simply to have left school at early ages. Many of these individuals probably will later return to school and perhaps even graduate, but they are at risk of never acquiring a satisfactory basic education.

The Determinants of Dropping Out

The NELS data confirm that minorities and children from low-resource families have above-average dropout rates (fig. 3). Dropout rates also differ when students are classified by many other variables available in the NELS data, but we would like to know which of these associations reflect the most important causal relationships. To judge better the effects of these personal and other factors on the odds of dropping, we conducted a logit regression analysis of individuals' dropout probabilities (see Data and Methods, pp. 33-34, for details on the analysis and definitions of variables used). For our independent variables, we selected 17 individual, family, school, and community variables that are either risk factors potentially leading to increased dropping out or resources potentially helping students to persevere in high school. Unlike simple tabulations, the logit coefficients for these variables provide estimates of each factor's independent effect on the probability of dropping out, holding all of the other factors constant.

The fourth column of table 2 reports our logit estimates of the effects of a unit increase in each of the 17 independent variables on the odds ratio for dropping out. For example, the 0.326 value for SES (socio-economic status) indicates that the dropout odds for an individual with an SES score one unit above a reference person's score is only 0.326 (about a third) as high as that of the reference person. Note that a value of 1.0 indicates that the variable has no effect on the risk of dropping out, a value larger than 1.0 indicates increased risks, and a value smaller than 1.0 indicates diminished risks (see Data and Methods, pp. 33-34, for an explanation of odds ratios).

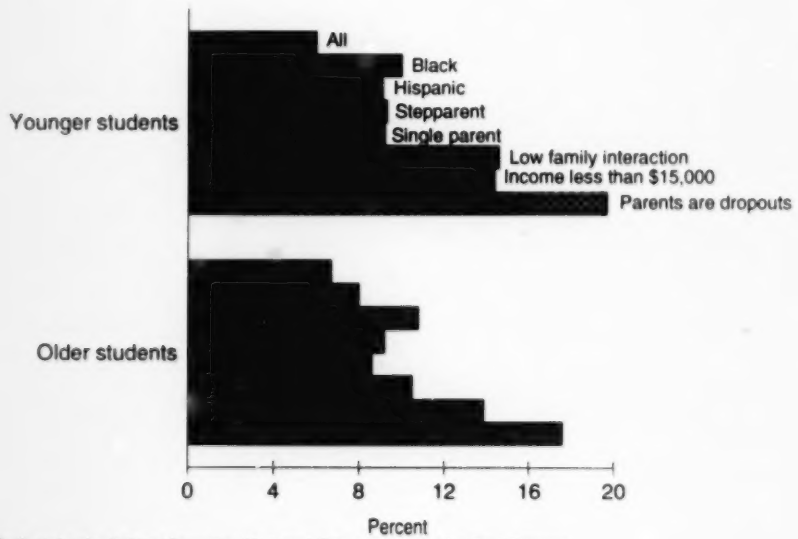
Some of the variables that alone are strongly associated with above-average dropout rates turn out to have no significant effect when we control for the effects of other variables. For example, once we control for family and school characteristics, Black and Hispanic students are not more likely to drop out than non-Hispanic Whites; indeed they appear slightly less likely to drop out. Rural and urban residences also lose their significance, suggesting that the schooling advantages of suburban students are adequately captured by the other independent variables. This does not mean that minority or rural students do not have above-average dropout rates, but that their higher dropout rates are due to their greater exposure to some of the risk factors, such as low family socio-economic status (SES), that are controlled for in the model.

Variables that significantly increase the risk of dropping out include low SES, living with a stepparent, limited

Figure 3

Dropout rate among students by age and risk factors

Having parents who dropped out of high school elevates younger and older students' dropout rates more than any other risk factor



Source: Authors' calculations from the National Education Longitudinal Survey.

Table 2

Logit analysis of the effects of risk factors and resources on dropout rates, by grade and residence

Lower socio-economic status of rural students' families is the most important factor elevating younger...

	Young students, 8th-10th grades, 1988-90					
	Data means			Logit model estimate of change in the risk of dropping out	Change in dropout risk from changing rural data mean to the mean for--	
Variable	Rural	Urban	Suburban		Urban students	Suburban students
	Average				Multiplicative effect on the odds ratio	
Black (yes=1)	0.080	0.245	0.081	0.864	NS	NS
Hispanic (yes=1)	.063	.166	.082	.726	NS	NS
Other nonwhite (yes=1)	.026	.066	.050	.519*	.974	.985
Female (yes=1)	.497	.510	.494	.915	NS	NS
South (yes=1)	.407	.426	.272	1.532***	1.008	.994
SES (-2.97 to 2.56)	-.279	-.108	.051	.326***	.825	.691
Stepparent (yes=1)	.153	.138	.150	1.361*	.995	.999
Single parent (yes=1)	.157	.228	.147	1.063	NS	NS
Number of siblings	1.291	1.265	1.276	.846**	1.004	1.003
Parent-child interaction (1 to 3.5)	2.657	2.709	2.713	.564***	.974	.968
Parents do not know friends (yes=1)	.077	.095	.062	1.464*	1.010	.994
Times changed school	1.017	1.328	1.145	1.462***	1.125	1.050
White enrollment in school (percent)	4 .569	3.425	4.514	.867**	1.021	1.008
Free lunch receipt in school (percent)	1.909	1.771	1.389	.809**	1.020	1.116
School attendance (percent)	94.2	92.8	94.1	.939***	1.084	.998
Rural (yes=1)	1	0	0	.972	NS	NS
Urban (yes=1)	0	1	0	1.133	NS	NS
Total compositional effect on the relative rural dropout odds ratio	NA	NA	NA	NA	1.009	.730

See notes at end of table.

--Continued

interactions with parents, parents not knowing their friends, frequently changing schools, and attending a school with a large minority enrollment. Living in the South increased the risk of dropping out among young students but was insignificant for older students. These findings strongly confirm that students whose families have adequate economic resources and whose parents are actively engaged in their lives are much less likely to experience school failure. The great importance of these family characteristics also suggests that it may be difficult for schools to offset the disadvantages faced by students lacking these resources.

Some of our other results are more difficult to interpret and, while offering some interesting insights, indicate a need for further research. For the younger—but not the older—students, schools with good attendance rates or many students receiving free lunches are apparently more successful at graduating their students. It seems reasonable that student attendance would be higher in schools offering a good learning environment, but the school lunch finding seems less reasonable and should be treated cautiously. We included the school lunch variable as a proxy for the prevalence of poverty among the student body and expected dropout rates to rise, rather than fall, with this variable because of a negative peer group effect from concentrated poverty. A possible, but speculative, explanation for the opposite result is that students whose incomes are high compared with their peers' incomes may do better in school. Holding family income constant, a student's relative income in the school is higher, the higher the share of other students who are poor.

Contrary to our expectations, older students' probabilities of dropping out are just as influenced by family variables as are the dropout probabilities for younger students.

Table 2

Logit analysis of the effects of risk factors and resources on dropout rates, by grade and residence--Continued

...and older students' dropout rates

Variable	Older students, 10th-12th grades, 1990-92: Averages			Logit model estimate of change in the risk of dropping out	Change in dropout risk from changing rural data mean to the mean for--	
	Rural	Urban	Suburban		Urban students	Suburban students
	Average			Multiplicative effect on the odds ratio		
Black (yes=1)	0.064	0.182	0.059	0.667*	0.953	1.002
Hispanic (yes=1)	.059	.139	.060	.822	NS	NS
Other nonwhite (yes=1)	.025	.067	.051	.783	NS	NS
Female (yes=1)	.498	.509	.491	1.057	NS	NS
South (yes=1)	.371	.363	.272	1.031	NS	NS
SES (-2.97 to 2.56)	-.162	.086	.190	.407**	.800	.729
Stepparent (yes=1)	.132	.129	.142	1.476**	.997	1.004
Single parent (yes=1)	.138	.159	.138	1.204	NS	NS
Number of siblings	1.815	1.779	1.738	1.200**	.993	.986
Parent-child interaction (1 to 3.5)	2.343	2.393	2.429	.769***	.987	.978
Parents do not know friends (yes=1)	.065	.063	.049	1.032	NS	NS
Times changed school	1.017	1.282	1.199	1.185***	1.045	1.031
White enrollment in school (percent)	4 .167	3.254	4.167	.895*	1.017	1.000
Free lunch receipt in school (%)	1.858	1.474	1.346	1.078	NS	NS
School attendance (percent)	93.4	92.1	93.0	1.009	NS	NS
Rural (yes=1)	1	0	0	1.190	NS	NS
Urban (yes=1)	0	1	0	.951	NS	NS
Total compositional effect on the relative rural dropout odds ratio	NA	NA	NA	NA	.793	.723

NA = Not applicable.

NS = Associated logit coefficient not statistically significant.

Note: ***,**,* denote statistical significance at 1-, 5-, and10-percent confidence levels, respectively.

Source: Calculated by authors using data from the National Education Longitudinal Survey.

Parent-child interactions diminish between 8th and 10th grades, reflecting increasing independence with age, but both age groups' school prospects strongly reflect conditions in their families. We also expected the dropout probability to be higher for students with more siblings, because they would receive less attention from their parents. This was the case in the older group, but not in the younger. We lack a satisfactory explanation for this result, but conjecture that older students in large families might face greater pressures to help with child care or to earn money.

Little Support Found for the Importance of Community-Level Variables, But that May Reflect Data Limitations

Our results provide no support for the prediction that higher social capital in rural communities enhances the educational outcomes of rural students. We could not include a direct measure of social capital among the model's independent variables because the NELS data do not contain a reliable measure of this rather elusive concept. Nonetheless, if rural communities benefit from an important social capital advantage, the rural residence variable should have picked up that advantage, which was not the case. An important task for future researchers, perhaps especially for those using ethnographic techniques, is to develop direct measures of social capital and its effects.

For the subsample of students for whom we could determine county of residence, we added an extensive list of county-level measures of labor market and other economic and social conditions to the list of independent variables supplied with the NELS. When added to the logit regression model, few of the county-level variables were

statistically significant. The insignificance of most county-level variables does not mean that community characteristics do not matter for school success. For example, labor market conditions clearly affect dropout rates indirectly, by first affecting family income levels and parents' occupations. Although we find no evidence for an additional, direct effect it may be that counties do not adequately capture the relevant neighborhoods within which these area effects operate. For example, in some areas the local labor market may embrace several counties and in others only a small part of the county of residence.

The few cases in which labor market variables explained a significant share of differences in the likelihood of dropping out were mostly limited to older students, consistent with our expectation that older students are more strongly affected by labor market conditions than younger. The labor market characteristic that appears to have the largest direct impact on lowering dropout rates is a relative abundance of midlevel jobs that do not require a college education. Contrary to our expectations, the availability of professional level jobs does not appear to be important to potential dropouts, except as it operates through family SES. This may be because the relevant alternative to dropping out for a struggling student is unlikely to be a professional degree. What matters is whether the local labor market offers a substantial number of less skilled jobs that a high school graduate can compete for. The availability of professional jobs may matter much more for college attendance (see Gibbs' article on pages 35-~~41~~).

Which Factors Most Disadvantage Rural Students?

Our analysis provides estimates of the effects of various risk factors on students' odds of successfully graduating. By combining these findings with data on the differential exposure of rural students to these risk factors, as compared with urban and suburban students, we can assess which of these risk factors play especially large roles in the rural dropout problem and hence require special attention in rural education and dropout prevention programs.

On average, rural, urban, and suburban students differ substantially on many of the factors potentially affecting dropping out of school (table 2, columns 1-3). For example, the family socio-economic status (SES) average is considerably lower for rural than urban students, who in turn have lower SES than suburban students. We calculated how the risk of dropping out would change for rural students if their mean value for that independent variable were changed to the urban (column 5) or suburban (column 6) mean values, with the change in dropout risk again expressed in terms of its multiplicative effect on the odds ratio. For example, the average rural student in the younger age group would be only 0.825 times as likely to drop out if his/her SES level increased to the average metro SES level and only 0.691 times as likely to drop out at the average suburban SES level. The corresponding values for an average older rural student are 0.800 and 0.729 times as likely to drop out.

Lower rural SES is the single largest factor elevating rural dropout rates relative to urban and suburban rates, but several other factors also advantage or disadvantage rural students. For example, rural dropout rates are also elevated by lower parent-child interaction than in urban and suburban families. On a more positive note, rural dropout rates are lowered because rural students less frequently experience the dislocation of changing schools. Other variables have smaller effects, or effects that vary depending on the age group considered or whether rural students are compared with urban or suburban students.

The total compositional effects indicate that rural dropout rates are raised quite strongly relative to suburban rates by differences in the independent variables for both the younger and the older students (table 2, bottom row). The corresponding odds ratios (0.730 and 0.723) are similar in magnitude to those implied by the rural and suburban dropout rates reported in table 1, indicating that our logit model does a good job of accounting for the excess of rural over suburban dropouts. The results for the rural/urban comparison are somewhat different. The total compositional differences between rural and urban students do a good job of explaining why the rural dropout rate is higher for the older students, but explain very little of the excess of the urban dropout rate for younger students.

Student Aspirations Provide Additional Insights

The educational and occupational aspirations of rural, urban, and suburban students can help to make sense of these dropout patterns. In choosing to drop out, students are making an important decision about their futures, so we would expect that how they envision their futures is a key factor in making that choice.

Students have quite high occupational aspirations, which have risen over time and appear to be overly optimistic compared with the mix of jobs available (table 3). When they were in the eighth grade, 52 percent of rural students expected to be employed in managerial, professional, or technical occupations at age 30. The percentage of students aspiring to those jobs rose steadily over the following 4 years, with 64 percent aspiring to them in their senior year. To some extent, this rise reflects the tendency of dropouts to have lower aspirations, but most of the rise reflects upward adjustments on the part of continuing students.

Table 3

Type of work expected at age 30 compared with occupational mix of employment

Rural students are less likely to aspire to professional jobs than urban and suburban students, but are still quite ambitious by historical standards

Group	Managerial, professional, or technical job	Craft or operative job
	Percent	
Type of work expected by:		
1988 8th-graders:		
Rural	51.6	7.6
Urban	59.0	5.0
Suburban	58.3	5.0
1990 10th-graders:		
Rural	61.3	8.7
Urban	70.2	5.8
Suburban	69.3	2.9
1992 12th-graders:		
Rural	63.5	6.2
Urban	74.1	3.1
Suburban	71.2	4.2
1980 12th-graders:		
Rural	50.8	13.2
Nonrural	65.1	7.8
Occupational mix of employment:		
1980--		
Nonmetro	19.9	32.3
Metro	27.4	25.1
1990--		
Nonmetro	22.6	29.0
Metro	32.0	20.5

Source: Jobs expected by students in 1988, 1990, and 1992, calculated by authors using data from the National Education Longitudinal Survey; jobs expected by students in 1980 from Cobb, McIntyre, and Pratt; and occupational mix calculated by the authors using data from the 1980 and 1990 Censuses of Population.

Compared with urban and suburban students, however, rural students have lower occupational aspirations. Urban and suburban students were even more likely than rural students to expect to hold the best paying and highest status jobs. Compared with opportunities to work in those fields, however, all students appear to be overly optimistic. While about two-thirds of high school seniors aspire to managerial, professional, and technical jobs, less than a quarter of nonmetro jobs and only a third of metro jobs were in those occupations in 1990. The other side of the coin is that fewer students aspire to craft and operative jobs than are available. This suggests a possible disconnection between school and work, particularly for students lacking a strong aptitude for advanced education. It also appears that this disconnection may have increased in recent years. High school seniors in 1980 were considerably less likely than 1992 seniors to aspire to professional jobs and more likely to aspire to the best blue collar jobs. While employment opportunities have declined for many of the best blue collar occupations, at least relative to many other occupations, students may be overreacting to this trend.

Students' educational plans paint a similar picture (table 4). Rural students are more likely to expect to complete high school or technical school, about as likely to expect to complete some college or a bachelor's degree, and much less likely to expect to complete more advanced degrees than urban and suburban students. However, a large majority of students in all three areas anticipate continuing their educations beyond high school. By the time they were seniors, less than one student in five anticipated no post-secondary education and over half anticipated earning a bachelor's or higher degree. Seniors in 1980 were considerably less likely to expect to complete college, a clear indication that high school students are now aware that advanced education is increasingly decisive in determining who gets ahead, but may also be unaware of potentially attractive career options that do not require advanced degrees.

Unrealistic or not, students' aspirations appear to influence schooling outcomes. Dropout rates are much higher for students with low educational and occupational aspirations (fig. 4). Students who aspire to professional occupations and the education levels those occupations require are more likely to persist in their schooling. Policies to raise the aspiration levels of rural students sometimes may be a valuable component of dropout prevention programs. However, the fact that urban students have higher aspirations than rural students, yet dropout at comparable rates, indicates that higher aspirations alone are not sufficient to guarantee schooling success.

Summary and Policy Implications

The dropout rate for nonmetro youths fell sharply between 1975 and 1993, closing the nonmetro-metro gap in high school completion, but only narrowing the rural-suburban gap. Despite these gains, more than 10 percent of rural youths still do not finish high school and probably face bleak employment prospects. We find that the effects of individual, family, community, and school risk factors on the probability of dropping out are similar for rural, suburban, and urban students, but the fraction of students exposed to these risks differs significantly across the three community types. Low parental education and family income appear to be the biggest barriers to reducing rural dropout rates. Low parent-child interaction also elevated rural dropout rates, but less frequent school changes lowered the rural rates. The fact that many of the most important causes of school failure appear to be rooted in family circumstances suggests the difficulty of developing effective remedies, especially at a time when

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Table 4

Students' educational expectations by grade and residence

Almost all students plan on post-secondary schooling, even in rural areas

Group	Won't finish high school	High school graduate	Vocational technical school	Some college	B.A. or B.S.	M.A. or higher
			Percent			
1988 8th-graders:						
Rural	2.0	13.9	11.3	13.5	40.7	18.7
Urban	1.5	8.8	8.6	14.0	41.7	25.4
Suburban	1.7	9.1	8.5	12.4	44.8	24.0
1990 10th-graders:						
Rural	2.6	15.1	16.2	17.0	28.0	21.1
Urban	1.9	10.0	11.9	16.4	30.1	29.7
Suburban	1.5	9.3	11.8	18.6	32.3	26.5
1992 12th-graders:						
Rural	.3	8.7	15.9	15.7	33.9	17.4
Urban	.3	4.4	8.6	12.5	37.6	35.4
Suburban	.1	5.1	11.1	15.7	35.7	32.2
1980 12th-graders:						
Rural	.8	22.8	23.0	15.4	22.6	13.3
Urban	.7	14.1	17.7	15.5	26.1	26.0
Suburban	.3	13.7	16.7	15.4	27.8	26.0

Source: Students' educational expectations in 1988, 1990, and 1992 calculated by authors using data from the National Education Longitudinal Survey; students' educational expectations in 1980 from Cobb, McIntyre, and Pratt.

Figure 4

Dropout rates for 8th graders by educational and occupational expectations

Low aspirations increase the likelihood of dropping out

Source: Calculated by authors using data from the National Education Longitudinal Survey.

general economic trends are eroding the position of low-skill workers.

Our results also indicate that the process of dropping out begins early in high school for many students, but that the factors causing school failure are quite similar for younger and older students. Larger numbers of siblings and adverse labor market conditions appear to adversely affect students only in the last 2 years of high school, suggesting that policies aimed at dropout prevention should be alert to potential strains faced by older students in balancing school with family responsibilities and work.

Somewhat more speculatively, our analysis of students' educational and occupational aspirations suggests that an important disconnection between schools and labor markets may have developed. Students appear to be acutely aware that the economy has shifted away from blue-collar jobs and that the best paying jobs are those requiring 4 or more years of college study, but may be overreacting to these trends. The fact that a majority of students who are planning their future are planning for a professional career suggests that students today have little belief that other careers are viable. This finding reinforces recent concerns that the school-to-work transition for students who are not bound for college is increasingly dysfunctional. The disconnection between schooling and nonprofessional careers appears to be no more severe in rural areas, but it may matter more in those areas, because a larger percentage of rural workers hold nonprofessional jobs.

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This disconnection also suggests that youth apprenticeships and similar initiatives, intended to better link secondary schooling and work for students who are not bound for college, may be timely.

For Further Reading. . .

N.M. Astone and S.S. McLanahan, "Family Structure, Parental Practices and High School Completion," *American Sociological Review* , Vol. 56, 1992, pp.309-20.

R.A. Cobb, W.G. McIntyre, and P.A. Pratt, "Vocational and Educational Aspirations of High School Students: A Problem for Rural America," *Research in Rural Education*, Vol. 6, 1989, p.2.

J. Coleman, "Social Capital in the Creation of Human Capital," *American Journal of Sociology*, Vol. 94, Supplement, 1988, pp.S95-S120.

Data and Methods

The National Education Longitudinal Study (NELS) of 1988 is comprised of approximately 25,000 eighth graders surveyed in 1988 with follow-up surveys conducted in 1990 and 1992. NELS is particularly well suited for our study of rural dropouts. The respondents are members of a recent cohort and were initially interviewed in eighth grade, allowing us to examine young dropouts. In addition to student data, NELS contains information gathered from parents, teachers, and school administrators, making possible many levels of analysis. Finally, we were able to use the NELS data to compare dropout patterns in rural schools to those in urban and suburban schools, although some complications arise.

The NELS data classify each student according to whether they attend a rural, urban, or suburban school. The NELS classifications do not correspond exactly to the Bureau of the Census' official designations of rural and urban places or to official metro and nonmetro county designations, but appear to be reasonably close approximations.

To verify these classifications and enable us to supplement the NELS data with county-level measures of labor market and social conditions, we received special permission from the U.S. Department of Education to attach county identifiers to the data. For technical reasons, we were able to obtain county identifiers for only 72 percent of the total NELS sample. Most significantly, county codes could not be obtained for any private school students. Thus, we conduct most of our empirical analysis using the full sample and the NELS urban categories. When we incorporated county-level information into the second logit analysis, we used the smaller sample.

From the cases to which we could attach a county code, the NELS urban-rural classification appears to be quite similar to the official metro-nonmetro designations. The county codes indicate that 99.5 percent of students living in a nonmetro county were classified by NELS as attending a rural school, and virtually every student classified by NELS as attending a suburban or urban school lived in a metro county. Note, however, that 17.1 percent of the students NELS identified as rural lived in metro counties, probably an accurate reflection of the fact that many metro counties are quite large and contain areas possessing a rural character.

Defining Dropouts

To examine possible differences in the likelihood of dropping out by age, we examine the data in two panels. Panel 1 respondents were selected on the condition of having completed interviews in both 1988 (as 8th graders) and 1990. We refer to this panel as younger students. Panel 2 respondents had to have been interviewed in 1990 (as 10th graders) and then again in 1992. We refer to this panel as older students.

Choosing a definition of "dropouts" is a complication that arises when using the NELS data. We followed the procedure suggested in the Department of Education's documentation of the data file.
For the period between 8th and 10th grades (panel 1), dropouts are students who were attending 8th grade in Spring 1988 but
- had been absent from school 20 or more consecutive days when contacted by an interviewer in Spring 1990, or
- had more than one episode of 20 or more days of absence and had been attending school for less than 2 weeks before the Spring 1990 interview.

For the period between 10th and 12th grades (panel 2), dropouts are students who were attending 10th grade at the time of the Spring 1990 interview but were neither graduates nor regularly attending school when contacted for the Spring 1992 interview.

—Continued next page

Logit Regression Analysis of the Causes of Dropping Out

Dropping out of high school is the result of a complex array of causes and multivariate regression is an indispensable tool for sorting out the relative importance of the various factors involved. We adopt a logit model, which is a widely used modification of standard regression techniques for cases when the dependent variable is the probability that an event, such as dropping out of school, occurs.

The estimated coefficients in a logit model are a little more difficult to interpret than are the more familiar standard regression coefficients. The key to interpretation is to think in terms of the effect of an independent variable on the odds ratio of the event happening, where the odds ratio is defined as the ratio of the probability the event happens to the probability of it not happening. Consider dropout rates. If a student has a 10-percent chance of dropping out, the corresponding odds ratio is 10 percent divided by 90 percent, or one-ninth. The effect of an increase in an independent variable can be expressed as its multiplicative effect on the odds ratio. Suppose we consider a second student who is the same in every respect except that he lives with a stepparent. If the logit coefficient indicates a multiplicative effect of 1.0 then living with a stepparent has no effect on the chances of dropping out. A multiplicative effect greater than 1.0 indicates increased chances of dropping out and an effect less than 1.0 a decrease.

Variables Used in the Logit Analysis

The logit model of the probability of dropping out reported in table 2 includes 17 independent variables that are available in the NELS. We include dummy variables for whether the student is Black, is of another nonwhite race, is Hispanic, is female, lives in the South, lives with a stepparent, lives with a single parent, has parents who do not know the students' friends, lives in a rural community, or lives in an urban community. We also include variables indicating the number of siblings and the number of times the student has changed schools. Three variables measuring the characteristics of the student's eighth grade school are also included: the percentage of students who are White, the percentage receiving free lunches, and the percentage attendance rate.

The final two independent variables require a little more explanation. Family socio-economic status (SES) is a composite measure of family income and parents' education and occupation. Parent-child interaction is a composite measure of parent child interactions that is constructed from seven separate questions about the breadth, depth, and frequency of interactions.

When we could identify the student's county of residence, we added a large number of variables measuring county economic and social conditions to our analysis file. Most of these measures were taken from 1990 Census of the Population county files. We also added some labor market variables from the Current Population Survey.

Robert M. Gibbs

Going Away to College and Wider Urban Job Opportunities Take Highly Educated Youth Away From Rural Areas

Rural high school graduates are less likely to graduate from college than are urban graduates, mostly because they are less likely to attend college in the first place. Less access to colleges and fewer well-educated adults in the local population account for much of the rural-urban difference. Half of all rural college attendees leave home and do not return by age 25. Those that do return are drawn largely by home ties and intervening life choices rather than by local job opportunities.

The average educational attainment of rural residents has risen steadily over the past three decades, with nearly 7 of every 10 rural adults 25 and older holding at least a high school diploma by 1990. The education gap between the rural and urban populations also narrowed because urban increases were not as large as rural. However, rural college graduation rates have risen more slowly than urban rates. The rural 2-percentage-point rise in college graduation during the 1980's (from 11 to 13 percent) compares with a 5-percentage-point rise in the urban rate (from 18 to 23 percent). If these rates of increase persist through the 1990's, urban dwellers will be twice as likely to hold college degrees by 2000, a gap not seen since World War II.

The growing rural-urban disparity in college-educated adults reflects a similar disparity in employment opportunities commensurate with the skills of well-educated workers during the 1980's. College-educated urbanites who might otherwise choose to live in rural locales often face poor job prospects there, and many rural residents are not able to remain or return after college.

Looking at the education completed by adults 25 and older at their current place of residence does not show how education decisions and migration work together to shape rural and urban trends in educational attainment. The overall statistics also do not show the effect of migration on the ability of rural areas to keep or attract highly educated young adults. The National Longitudinal Survey of Youth (NLSY) tracks the education and location of young adults, however. See Data and Methods, p. 44, for a description of the NLSY.

Data from the NLSY indicate that rural high school graduates continue to be less likely to graduate from college than are their urban counterparts, mostly because they are less likely to attend in the first place. Local job opportunities and local access to colleges, along with personal characteristics, affect both the college decisions of rural students and their choice of residence after college. Rural and urban residents face fundamentally different levels of skill and knowledge demands in the workplace, as well as different access to higher education. Rural residents are less likely to have a local college or to live within easy reach of one. Rural high school graduates who do attend college go to less expensive and less academically selective schools, although their fields of study are much like those of their urban counterparts. Rural areas lose well over half of their college graduates to urban areas, but do get some urban college graduates in return. Home ties and intervening life choices appear to be more important factors in the average rural graduate's decision whether to return to a rural area, while labor market conditions appear to more strongly influence the average urban graduate.

Robert Gibbs is a regional economist in the Rural Economy Division, ERS.

Rural Youth Are Much Less Likely to Graduate from College than Urban Youth

College graduation rates among young adults in rural areas reflect a succession of decisions. The college graduate must first acquire a high school diploma, then decide to attend college, and then complete a program of study. If the college is away from home, the graduate must decide whether to return; if the college is local, he or she must decide whether to leave after graduation. These decisions are determined by personal attributes and preferences as well as by family, labor market, and societal forces.

Understanding why rural young adults have lower college graduation rates, then, requires looking at urban-rural differences at each schooling transition decision. Rural and urban young people are equally likely to graduate from high school, with about 85 percent of each group acquiring diplomas or GED's (table 1). Differences emerge at the point of college attendance; 65 percent of urban high school graduates reported attending college, compared with 56 percent of rural respondents. This gap essentially disappears at the next level. Among college attendees, urban and rural students are equally likely to finish their college programs, with rural students slightly ahead of urban in completing any degree (including 2-year programs) and urban students slightly ahead of rural students in completing 4-year degrees.

These patterns are consistent for men, women, and Whites. Within each of these groups, rural and urban students are equally likely to be high school graduates, but rural students are significantly less likely to attend college. Among those who attend, graduation rates are virtually identical.

Blacks, whose attainment rates at all stages fall well below those of Whites, stray from this pattern. Rural Blacks' college attendance rate is much lower than their urban counterparts' rate, but rural Black attendees complete a college program, whether 2-year or 4-year, much more often than urban Black attendees. Lower family incomes, lower parental educational attainment, and, for many, poorer home areas, undoubtedly provide fewer resources and less motivation for rural Blacks to go to college.

Being rural and Black overwhelmingly means being southern (just over 90 percent of nonmetro Blacks lived in the South in 1990). Therefore, region may explain a portion of the disparity between rural Blacks and other groups. Comparisons among Blacks, all Whites, and southern Whites help reveal the regional effect on attainment. Rural southern Whites graduate from high school at a rate similar to that of urban Blacks, that is, more frequently than rural Blacks but less frequently than urban Whites. At this level of education, being in the rural South and being Black appear to be equally disadvantageous. But, college attendance and graduation rates are indistinguishable for rural southern and all Whites, while both rural and urban Blacks are much less likely than Whites to attend or graduate. Region, then, figures prominently in high school, but not college, attainment, while race figures in both.

Explaining the College Attendance Gap

Since the "sticking point" appears primarily to be college attendance, it seems reasonable to ask why rural youth

Table 1

Educational attainment rates for young adults by gender, race, and region, 1982-89

Lower college attendance rates for rural young adults explain most of the urban-rural college graduation gap

Education attained	Total		Men		Women		Blacks		Whites		Southern Whites	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
	Percent											
Graduated from high school	85	86	83	84	86	87	75	78	86	87	79	84
Went on to college	56	65	54	64	58	66	47	62	57	66	56	69
Graduated from a 2- or 4-year program	53	52	54	53	52	51	43	34	54	55	54	55
Graduated from a 4-year program	39	41	42	43	37	39	33	22	40	44	44	43

Note: Young adults were ages 14-21 in 1978. The reported percentages are based on the number of young adults who attained the preceding education level.

Source: Calculated by ERS using data from the National Longitudinal Survey of Youth.

are less likely to attend college. In an age when information and geographic mobility are less costly than ever before, one could assume that rural youth see the financial, social, and personal advantages of college education in much the same way as urban youth. Paasch and Swaim found that about two-thirds of rural high school seniors aspire to professional jobs and at least some college education, only a slightly smaller share than of urban seniors (see pages 24-34). Hence, differences in rural and urban attendance rates should mostly reflect differences in high school academic preparation and income. Earlier in this issue, Teixeira and Greenberg, pp. 17-23, demonstrate that while rural and urban high school students score about equally well on tests of math, reading, and science ability, rural schools are less likely to offer advanced courses critical to adequate college preparation.

The longstanding gap between rural and urban incomes may be the most powerful constraint on college attendance. During the 1980's, median rural family income averaged about 75 percent of the urban median, according to census figures. Among young people who attended college, the NLSY sample indicates that the median family income of rural students was 87 percent of urban students' family income (table 2). The difference between the two income estimates arises from higher-than-average family incomes among rural college attendees.

Rural students can close the income gap either by attending less expensive colleges or by obtaining larger amounts of financial aid than urban students. The median tuition faced by rural students is over $400 (36 percent) lower than tuition for urban students, suggesting that they do select less expensive colleges (table 2). While their tuition is lower, larger shares of rural than urban students obtain loans and grants. Among those receiving financial assistance, both rural and urban loans average $2,500, and grants to rural students average only $100 less than those to urban students. The greater use of these strategies among rural students suggests that their decision to attend is more sensitive to loan and grant availability, as well as to the geographic availability of affordable colleges.

Table 2

Financial resources and obligations of college attendees

Lower family income may cause rural students to attend less expensive colleges and seek loans and grants more often than urban students

Item	Unit	Rural	Urban
Median family income	Dollars	30,045	34,500
Students receiving loans	Percent	33.1	27.0
Median amount received	Dollars	2,500	2,500
Students receiving grants	Percent	48.6	37.8
Median amount received	Dollars	1,400	1,500
Median annual tuition[1]	do.	747	1,174

[1]Includes students who attended either 2-year or 4-year colleges. These statistics are based on tuition rates for the 1980-81 school year, about the middle of the period when most respondents were attending college. The comparable figures for the 1990-91 school year are $1,800 for rural and $2,552 for urban students.

Source: Calculated by ERS using data from the National Longitudinal Survey of Youth, the Current Population Survey, and the Higher Education General Information Survey.

Low Access to Colleges and Few Highly Educated Role Models Dampen Rural Attendance

Rural students face clear disadvantages regarding college information and access. About half of all rural high school students live in counties with no college, compared with 11 percent of urban students (table 3). Rural areas also have few highly educated workers to illustrate the value of attending college or high-skill jobs to reward a college degree. About 80 percent of rural (versus 21 percent of urban) students live in counties in which less than 15 percent of the resident labor force hold a bachelor's or higher degree (table 3).

Along with geographic limitations, family and social environments, the chief sources of "social capital," affect the choice to attend college. These forces can create positive or negative images of college life, make the transition to a college environment easy or hard, and reinforce or weaken the desire to maintain socioeconomic status at or above that of the previous generation. Social capital also contributes to students' performance on college entrance exams, to their perceptions of college opportunities, and to their decisions regarding whether or when to marry and have children.

Table 3

Share of students living in counties with colleges or college-educated workforce

About half of all rural high school students live in counties with no college; Few rural areas match the education levels of most urban areas.

County characteristic	Rural	Urban
	Percentage of respondents	
No college	49.1	10.6
One or more 2- or 4-year colleges	50.9	89.4
One or more 4-year colleges	28.9	82.0
Less than 15 percent of local workforce has a 4-year college degree	79.8	21.0

Source: Calculated by ERS using data from the National Longitudinal Survey of Youth

Which Conditions Have the Strongest Effects on College Attendance?

Lower rural college attendance rates, then, appear to result from a combination of individual, family, and local area factors. Logistic regression identifies the force of each characteristic on college attendance, holding all other factors constant (table 4). Values greater than 1.0 indicate that the variable is associated with an increased likelihood of attendance. Values less than 1.0 indicate a decreased likelihood. See Data and Methods, p. 44, for a description of the logistic regression technique and an explanation of odds ratios.

In the first equation, individual and family characteristics are controlled to test possible sources of rural-urban differences. Students with higher grade point averages in early high school, who graduate at younger ages, or who have college-educated parents are more likely to attend college (table 4). Students who had children while in high school are less likely to attend. Family poverty status at the time of the initial interview is not significantly related to college attendance, probably an indication of its inadequacy as a proxy for the income level at which college attendance starts to become affordable. Blacks are more likely to attend college than are Whites once grade point, income, and family characteristics are controlled, as are children from female-headed households (compared with children from other households). Students from Black and female-headed families appear to more highly value the status mobility that a college degree engenders. Despite the power of individual and family factors, rural residence continued to strongly and negatively influence college attendance.

Table 4

Tests for rural-urban differences in college attendance

The effects of a rural origin are greatly reduced when college access and local education levels are accounted for

	Individual and family characteristics	Plus region and 2- or 4-year college in county
	Multiplicative effect on the odds-ratio	
Grades	1.952***	1.988***
Black	1.412***	1.327**
Male	1.082	1.092
HS graduation age	0.765***	0.766***
Father's education	4.840***	4.602***
Mother's education	3.257***	3.205***
From female-headed family	1.354**	1.341**
Got married in HS	1.006	1.007
Had child in HS	0.607***	0.617***
From poor family	0.984	0.969
Rural residence	0.775**	0.977
Midwest	NA	0.903
South	NA	1.190
West	NA	1.226*
Percent of labor force with college education	NA	3.985*
2- or 4-year college in county	NA	1.279***

NA = not applicable.
* = significant at 0.10 level.
** = significant at 0.05 level.
*** = significant at 0.01 level.
Source: Calculated by ERS using data from the National Longitudinal Survey of Youth

The second equation incorporates regional, local workforce, and college access effects. The presence of either a 2- or 4-year college encourages attendance and renders rural residence insignificant. This finding suggests that poor access to colleges accounts for much of the lower attendance rate among rural high school graduates.

The higher the share of college-educated workers in the local workforce, the more likely students are to attend college. The social and economic environment indicated by a large college-educated population may provide supplemental social capital, especially to those students whose families provide low social capital levels. As expected, the effect of area education levels on the probability of attending college depends in large part on high school achievement and family education levels. For students with high GPA's and highly educated families, local levels make little difference, nor does rural residence (table 5). For students with average grades and non-college educated parents, ruralness and local education levels matter—the probability of attending college for urban students is 5 points higher in high-education than in low-education areas. For rural students, the difference is 6 percentage points. Similarly, rural residence reduces the likelihood of college attendance by 4 to 5 points, depending on area education levels.

Whether the various familial, social, economic, and environmental characteristics have different effects on college attendance by rural students can be tested by looking at rural students alone (table 6). The rural-only model generally confirms the results of the rural-urban models. Most variables significantly associated with college attendance in the first set of models are significant in the rural-only model as well. I also added urban proximity—adjacency to a metro area—as a measure of access. Adjacency to a metro area has a strongly positive effect on attendance; it may capture both college access and exposure to relatively high-skill labor markets.

Differences between the models emerge as well, however. Neither presence of a local college nor labor force educa-

Table 5

Probability of college attendance given selected characteristics

Urban and rural students who excel in school and live in high-education environments are equally likely to attend college.

Parents' education and students' GPA	Share of area workforce that is college educated	Probability of attending college: Urban	Rural
	Percent	Ratio	
College/3.5	20	0.98	0.98
College/3.5	10	.98	.97
No college/2.5	20	.66	.62
No college/2.5	10	.61	.56

Note: Probabilities are calculated for a nonpoor white male westerner in a 2-parent household and a non-college town. Probabilities will vary slightly if a different set of characteristics is assumed.

Source: Calculated by ERS using data from the National Longitudinal Survey of Youth

Table 6

Factors affecting the likelihood of rural students attending college

Proximity to a metro area increases the chances of attending college

Item	Multiplicative effect on odds ratio
Grades	2.068***
Black	1.329
Male	0.880
HS graduation age	0.987
Father's education	6.870***
Mother's education	3.568***
From female-headed family	1.445
Got married in HS	0.909
Had child in HS	0.372***
From poor family	0.872
Midwest	3.980***
South	3.695***
West	4.017***
In county adjacent to a metro county	1.566***
Percent of labor force that is college educated	1.239
2- or 4-year college in home county	2.146

* = significant at 10-percent level.
** = significant at 05-percent level.
*** = significant at 1-percent level.

Source: Calculated by ERS using data from the National Longitudinal Survey of Youth

tion levels significantly influences attendance within rural areas. Regional differences also appear among rural students, in contrast with negligible region effects for the combined sample. These last results, however, should be interpreted with caution. Rural students in all other regions of the country are shown to be more likely to attend college than students in the Northeast, a finding that is difficult to corroborate with other research.

Similarities in Rural and Urban College Careers

Rural-urban differences in income, academic preparation, and access suggest that the type and location of colleges chosen will also differ. Unsurprisingly, since most students attend schools within 50 miles of home, urban students are much more likely to attend colleges in urban locations than are rural students (table 7). Although only 20 percent of all colleges are located in rural areas, 53 percent of rural students attend rural colleges, pointing to the strong hold of "home," or at least of familiarity.

Rural students are also significantly more likely to attend public colleges. Several factors may contribute to their disproportionate representation. On average, public colleges in rural areas are more numerous and have larger enrollments than private colleges, both in absolute terms and relative to the public/private ratio in urban areas. Rural students are less able to afford the higher tuition that private colleges typically charge. Finally, public colleges are less likely to require advanced high school coursework, which is often lacking in rural schools. Rural students are half as likely as urban students to attend or graduate from more competitive schools. Of the 335 schools classified as "most," "highly," or "very" competitive in the 1995 edition of Barron's Profiles of American Colleges, only 61 are rural. Combined with lower SAT scores, lower access to advanced preparatory courses, and lower family income, location also limits rural students' ability to attend the more competitive schools.

Migration and Local Human Capital Change

College attendance was a primary motivation of rural young people's outmigration during the 1980's, and the loss was not fully compensated by inmigration of urban young people (table 8). Rural counties experienced a net loss of 16 percent of their young population. About 35 percent of rural young people left their counties for urban areas and did not return by age 25, while a number of

urban young people equivalent to 19 percent of rural young people moved in. About 15 percent of rural young people moved between rural counties, having no effect on the overall rural loss of young people, but undoubtedly leaving some rural counties with fewer young people. Movement varies widely by educational attainment. The overall rural net loss rose from 11 percent of high school dropouts and graduates, to 15 percent of nongraduating college attendees, to 30 percent of graduates with 4 or more years of college.

Migration differences by education clearly change the educational composition of the rural population. Dropouts and high school graduates comprise a much larger share of young people who stayed in rural areas than of those lost to urban areas. At the other end of the educational spectrum, 4-year college graduates are only 10 percent of stayers but 35 percent of those lost to urban areas. The outmigration of young people from rural areas, then, significantly reduces overall human capital levels.

Most college attendees, about 75 percent, do move to a different county to attend school. Retaining graduates who have stayed at home and recapturing those that have left present two separate problems for local areas. Graduates away from home experience more intervening opportunities, and may have weaker ties to home. Graduates who attend local colleges may do so because of stronger attachments to the local area, as well as to minimize housing and/or food expenses. Hence, they may be more willing to stay after graduation.

About 25 percent of rural students stay in their home county to attend college and 16 percent are still there by age 25 (table 9). Of the 75 percent who left to go to college, about a third returned home by age 25. As a result, the rural counties kept or regained 40 percent of their native college attendees. If the definition of "home" is expanded to the local commuting zone rather than the county, the proportion who stay or return increases to 49 percent. (See Data and Methods, p. 34, for a definition of commuting zones.)

Migration undertaken by rural students to attend college is not necessarily detrimental to the home area. True, young people often must move to attend the college of their choice, a process that weakens the links between person and homeplace and may ultimately separate people with newly-acquired human capital from their origins. Rural counties could benefit from losing a large percentage of their young people to outside colleges, however, if social ties and local economic opportunities are strong enough to bring the college educated and their skills back after graduation.

Table 7

College characteristics and selected fields of study by metro status

Rural students are more likely to attend rural, public, and less competitive colleges.

	Attendees		Graduates[1]	
Item	Rural	Urban	Rural	Urban
	Percent			
Type of college:				
Urban	46.7	88.4	54.1	85.6
Public	82.3	74.2	81.8	60.5
In-state	83.0	79.5	81.7	70.7
More competitive[2]	7.1	15.0	14.9	33.6

[1]Bachelor's degree or higher.

[2]Includes "most," "highly," and "very" competitive schools defined in *Barron's Profile of American Colleges*, 1995.

Source: Calculated by the author using data from the 1991 National Longitudinal Survey of Youth.

Table 8

Rural in- and outmigration rates by education

Rural-to-urban migration rates for 4-year or more college graduates were twice that of dropouts, and their share of rural net losses was three times as large

Item	Total	Dropout	High school graduate	College attendee	College graduate	Bachelor's or higher degree[1]
			Percent			
Out to urban areas	35	29	26	35	53	58
In from urban areas	19	18	15	20	26	28
Within rural areas	15	16	13	15	15	16
Net change	-16	-11	-11	-15	-27	-30
Share of total loss	NA	10	25	22	43	35
Share of stayers	NA	17	45	22	16	10

[1]Subset of all college graduates who include those obtaining 2-year, associates degrees.

Source:: Calculated by ERS using data from the National Longitudinal Survey of Youth.

Causes and Consequences of Return Migration

Return migrants make up about 31 percent of the pool of college graduates in rural areas, less than inmigrants from other counties (49 percent), and more than stayers (20 percent). Return migrants are a useful group for studying area attributes that attract college graduates. Like college-educated stayers, most leavers have attachments to home, whether in the form of ties to family and friends, assets such as "the old homestead," or past employers. But like nonnatives, they possess information about economic opportunities in other areas, at least the one in which they went to school, and may have formed attachments to other places, particularly through marriage.

Controlling attachments and economic conditions simultaneously allows us to determine whether either set of factors is primarily responsible for lower rural than urban return rates, and whether specific factors in the return decision vary for rural- and urban-raised graduates (table 10). Because of survey limitations, the estimated models

Table 9

Patterns of college and post-college mobility for rural attendees

Two-thirds of rural students who attend college locally remain in the area after graduation; two-thirds of those who leave do not come back

	County			Commuting zone		
	College	After college		College	After college	
			Percent			Percent
Home	25	Home	16	40	Home	29
		Away	9		Away	11
Away	75	Home	24	60	Home	20
		Away	51		Away	40
Returners/stayers			40			49
Leavers			60			51

Source: Calculated by using data from the 1991 National Longitudinal Survey of Youth.

Table 10

Factors associated with post-college return migration

Rural graduates are as likely to return home as urban graduates, once distance, region, and labor market conditions are accounted for

Variable	Personal characteristics	Plus home county characteristics	Rural attendees	Urban attendees
		Multiplicative effect on odds-ratios		
Female	1.408***	1.421***	2.078**	1.277*
From poor family	0.776	0.814	1.303	0.693
From female-headed family	1.726***	2.328***	3.112**	2.171***
Married/had child	1.633	2.166**	3.161**	1.568
Rural residence	0.494***	0.900	NA	NA
Distance to home	NA	0.706***	0.607**	0.712***
Home earnings	NA	1.093***	1.087	1.105***
Home job growth	NA	1.018***	1.018	1.020***
Home in Midwest	NA	1.137	1.240	1.068
Home in South	NA	0.985	0.810	1.050
Home in West	NA	0.543**	0.071	0.640

* = significant at 10-percent level.
** = significant at 5-percent level.
*** = significant at 1-percent level.
Source:: Calculated by the author using data from the 1991 National Longitudinal Survey of Youth.

cannot capture some important effects, such as past employment, friendship networks, and detailed labor market characteristics.

The first model tests only the effects of rural residence and attachments on the probability of returning to the home county by age 25. Attachments are measured by whether the respondent is female, whether the origin family was poor, whether the origin family was headed by a single woman, and whether the respondent was married or had a child during his/her college career. Women are more likely to be cast in caretaking roles, and poor or single parents are more likely to require their children's assistance. Marriage and having children while away from home have potentially ambiguous effects. They signal the graduate's intention to "settle down" (and home may be viewed more positively in that context). However, they also introduce a spouse's set of attachments into the equation.

As it turns out, the negative effect of rural residence on returning home is independent of attachment measures, of which only two, being female and having a single mother, are significant. When distance from home (which captures both attachment and intervening opportunities) and labor market characteristics are added, the significance of rural residence disappears. High earnings and rapid job growth in the home county appear to be strong draws for native graduates. Distance between home and college acts as a significant barrier to return. The effects of home region are unimpressive except for western home counties. Since distance is controlled (an otherwise likely source of western uniqueness), the significant and negative effect of growing up in the West confirms other studies that have found unusually high levels of population "turnover" in the West.

When rural and urban returnees are analyzed separately, the results of the two estimations generally agree. Attachment variables appear to play a larger role for rural graduates, while labor market conditions are more important factors for urban graduates. The positive effects of being female and of getting married or having a child on returning are much stronger for rural-raised graduates, perhaps reflecting rural-urban differences in attitudes toward the role of extended families, or the intervening effects of spouses. As is true for the combined sample estimation, greater home-college distance discourages return for both urban and rural college graduates, with the effect being slightly stronger for rural graduates.

While home ties and intervening life choices appear to predict rural college graduates' residential decision, one should be careful not to underestimate the importance of the labor market based on this analysis alone. The statistical insignificance of these variables may be deceptive, since the smaller rural sample size makes significance at a given level more difficult to attain. Similar odds-ratios in the rural and urban models, for example, point to small sample size rather than weak labor market effects.

Do stronger labor market effects for urban-raised graduates translate into better employment outcomes for them than for rural-raised graduates? The answer depends, in part, on where they go after college (table 11). Comparing rural and urban graduates and ignoring post-college residence, urban graduates have higher employment rates and higher earnings, and are slightly more likely to work in higher status occupations than are rural graduates.

Table 11
Employment characteristics of 25-year-old college graduates
Rural natives in urban areas earn less than urban natives there by age 25—but their job status is slightly higher

	Location at age 14		Location at age 14/location at age 25			
Characteristics at age 25	Rural	Urban	Rural/rural	Rural/urban	Urban/rural	Urban/urban
			Dollars			
Median family income	25,050	27,240	24,525	25,585	21,615	27,800
			Percent			
Employment status:						
Employed	81.7	84.6	75.0	87.8	78.7	85.0
In school	6.4	6.4	6.5	6.2	8.4	6.3
Other	12.9	9.0	18.5	6.0	13.9	8.7
Occupation:						
Managerial/administrative	9.3	11.6	4.4	13.2	11.0	11.7
Professional	31.7	32.0	26.5	36.0	34.4	31.7
Technical	4.8	7.0	5.4	4.3	8.2	6.9
Other	54.2	49.4	63.8	46.6	46.4	49.7

Source: Calculated by ERS using data from the 1991 National Longitudinal Survey of Youth.

When broken down by pre-college and post-college residence, labor market outcomes differ substantially. Rural graduates who live in urban areas after college are more likely to be employed and work in managerial, administrative, or professional occupations than are those who stayed in or returned to rural areas or than urban graduates in either rural or urban areas. However, the average earnings of rural graduates in urban areas are lower than the earnings of urban-urban graduates. Rural students who stayed in or returned to rural areas have the lowest employment rates and are much less likely to be found in white-collar occupations, reflecting the smaller demand for such workers by rural firms.

In general, post-college residence appears to be a critical predictor of labor market success, suggesting that rural graduates "overcome" their origins. The return migration models, however, show that personal factors constrain market outcomes. The pull of family ties, for example, may induce rural graduates to accept lower returns on their education, in effect lowering the economic value of their college degrees to return home.

Conclusion

Lower college attendance has been shown to be the single most important component of lower rural college completion rates. Rural students, on average, are less likely to have individual and family traits associated with attendance. Thus rural-urban differences in completion rates largely reflect the geographic distribution of these traits. Yet environmental forces also operate on the individual's aspirations. Local education levels are associated with an individual's decision to attend college. A more highly educated population may foster a better education system and create a social environment that supports scholastic achievement and an economic environment that monetarily rewards it.

Rural college graduates are more likely to attend rural and public colleges and universities, and only half as likely to finish at selective institutions. While these choices have possible career repercussions, post-college plans appear to play a larger role in the economic well-being of rural graduates. Rural graduates who leave the countryside fare quite well compared with urban graduates in terms of employment and occupational status. Furthermore, whatever their college choice, graduates who live in rural areas after college, regardless of pre-college residence, fare worse financially than urban dwellers.

These findings help explain why rural counties recapture only 70 percent of the equivalent number of their college-bound youth by age 25, reinforcing the cycle of low education levels and low college attendance rates in rural areas. Still, over half of the rural college-educated population at this age are natives. Coming from rural areas, natives are more likely to attend rural schools and hence to stay in the local area after college. Moreover, the pull of home acts as a counterweight to the tug of better urban job prospects. The "home-grown" supply of highly educated labor, then, forms an essential part of the rural skills mix.

For Further Reading. . .

J. R. Behrman, R. A. Pollak, and P. Taubman, "Family Resources, Family Size, and Access to Financing for College Education," *Journal of Political Economy*, Vol. 97, No. 2, 1989, pp. 398-419.

W. Fuller, C. Manski, and D. Wise, "New Evidence on Economic Determinants of Postsecondary Schooling Choices," *Journal of Human Resources*, Vol. 17, No. 4, 1982, pp. 477-98.

R. M. Gibbs and J. B. Cromartie, "Rural Youth Outmigration: How Big Is the Problem and For Whom?" *Rural Development Perspectives*, Vol 10, No. 1, Oct. 1994, pp. 9-16.

R. M. Hauser, "Trends in College Entry among Whites, Blacks, and Hispanics," in C.T. Clotfelter and M. Rothschild (eds.), *Studies of Supply and Demand in Higher Education*, University of Chicago Press, Chicago, IL, 1993, pp. 61-104.

T. J. Kane and C. Rouse, *Labor Market Returns to Two- and Four-Year Colleges: Is a Credit a Credit and Do Degrees Matter?* National Bureau of Economic Research, Cambridge, MA, Working Paper No. 4268, Jan., 1993.

M. Sizer Killian and C. Tolbert, "Mapping Social and Economic Space: The Delineation of Local Labor Markets in the United States," in J. Singelmann and F.A. Deseran (eds.), *Inequalities in Labor Market Areas*, Westview Press, Boulder, CO, 1993, pp. 69-79.

D. T. Lichter, G. T. Cornwall, and D. J. Eggebeen, "Harvesting Human Capital: Family Structure and Education Among Rural Youth," *Rural Sociology*, Vol. 58, No. 1, Spring 1993, pp.53-75.

Data and Methods

The National Longitudinal Survey of Youth, a project of the Center for Human Resource Research at Ohio State University, has been conducted annually since 1979. Its 12,686 original respondents ranged from ages 14 to 21 in 1978, so that the youngest of the 8 age cohorts was 26 by 1990. Blacks and those in poverty are sampled in disproportionately large numbers to allow reasonably detailed analyses of these groups. Weights are provided for each respondent so that a national random sample of youth can be approximated.

Regardless of their ages at the time of interview, respondents were asked for their county of residence at age 14. Respondents for whom residence identification was possible at ages 14 and 25, equaled about 9,000. (Information for most of the military sample at age 25 was missing, since the majority were not followed after 1984.) Not all questions concerning college choice and family background are available in all years for all respondents. Partial samples were analyzed where appropriate.

The terms "rural" and "urban" refer to nonmetro and metro counties as designated by the Office of Management and Budget in 1993. Where analysis is performed on the commuting zone rather than the county, the commuting zones are groups of counties within which workers commute to jobs more than they do to counties outside their zone. The zones were developed by Killian and Tolbert (see "For Further Reading").

Definitions

Respondents are considered high school graduates if the highest grade completed was 16 or more years or the highest degree awarded by 1990 was a high school diploma or GED.

Respondents are considered college attendants if they answered that they had attended college at some point and they were high school graduates.

Respondents are considered college graduates if they are college attendants and the highest degree awarded by 1990 was at least an associate's degree.

Logistic Regression Analysis

The models are estimated with logistic regression, an appropriate method when the dependent variable, in this case college attendance or returning to home county, takes only two possible values (yes or no).

The estimated coefficients in a logit model are a little more difficult to interpret than are the more familiar standard regression coefficients. The key to interpretation is to think in terms of the effect of an independent variable on the odds ratio of the event happening, where the odds ratio is defined as the ratio of the probability the event happens to the probability of it not happening. Consider dropout rates. If a student has a 30 percent chance of attending college, the corresponding odds ratio is 30 percent divided by 70 percent, or 0.429. The effect of an increase in an independent variable can be expressed as its multiplicative effect on the odds ratio. Suppose we consider a second high school graduate who is the same in every respect except that he lives in a county without a college. If the logit coefficient indicates a multiplicative effect of 1.0, then living in that type of county has no effect on the chances of going on to college. A multiplicative effect greater than 1.0 indicates increased chances of going to college and an effect less than 1.0 indicates decreased chances.

Elizabeth J. Greenberg, Paul L. Swaim, and Ruy A. Teixeira

Workers With Higher Literacy Skills Not as Well Rewarded in Rural Areas

According to the 1992 National Adult Literacy Survey, rural workers score somewhat lower than their urban counterparts in their ability to use written and quantitative materials. However, younger rural workers' scores are not significantly different from urban workers' scores, reflecting the positive changes in the rural education system over the past several decades. Additionally, rural workers earn less than urban workers with the same literacy skills. This finding suggests that increasing rural literacy may not be enough to attract more high-paying jobs to rural areas.

THE importance of universal literacy to democratic institutions and the Nation's prosperity has long been appreciated. More recently, several major studies of workforce quality have concluded that good literacy skills have become a precondition for economic success. Perhaps the most influential of these studies was the 1992 report by the Secretary of Labor's Commission on Achieving Necessary Skills (SCANS), which emphasized the growing importance of basic academic and communication skills for workers. These conclusions, summarized in a list of "SCANS skills," are playing an influential role in national efforts to improve schools, school-to-work transition, and adjustment assistance for displaced workers (see "SCANS Skills," p.46).

The argument for an increased literacy threshold is easily summarized. Computers and other new technologies, as well as organizational strategies that enhance flexibility through decentralized decisionmaking, mean that information processing tasks are an increasingly important component of job responsibilities. A growing number of workers must use symbolic information, presented in computer graphics, written manuals, and other diverse forms. Workers are also frequently required to communicate information they have collected or generated to customers, managers, or other workers. Over the span of workers' careers, continuous learning looms larger as job requirements—and often employers—more frequently change. Lifelong education and training is much more difficult for workers lacking good literacy skills. In short, literacy is a critical threshold skill for workers in the "information age." It follows that the literacy levels of the rural workforce are an important component of rural human capital supply with far-reaching implications for the economic prospects of rural workers and their communities.

The recent release of data from an unprecedented survey—the 1992 National Adult Literacy Survey (NALS)—allowed us to analyze rural workforce literacy (see "Data and Methods," p. 51, for details on the NALS). Although rural literacy is closely related to educational attainment (see articles by Paasch and Swaim, pp. 24-34 and Gibbs, pp. 35-44) and educational achievement (see article by Greenberg and Teixeira, pp. 17-23), our analyses of adult literacy add two important new dimensions to an overall assessment of rural human capital. First, we look beyond the qualifications of future rural workers—those coming out of high school or college today—to assess the skills of the current adult workforce. Many of today's workers completed their schooling at a time when fewer rural than urban youths completed high school and rural achievement levels lagged. Second, the NALS provides a continuous and multidimensional measure of literacy skills applied on the job and in other nonacademic contexts by adults. Literacy is not a simple threshold, such as the ability to sign one's name or complete grade school. Rather, workforce literacy is a continuous measure of individuals'

Elizabeth Greenberg is a social science analyst employed by the Washington State University, Pullman. Paul Swaim is an economist at the Organization for Economic Cooperation and Development, Paris, France, and Ruy Teixeira is a sociologist in the Rural Economy Division, ERS.

proficiency at information processing tasks, which is related to, but is not directly measured by, years of schooling or scores on academic achievement tests.

Rural Workforce Literacy

The literacy levels of rural adults vary widely, but are quite low on average (table 1). The average rural scores on prose, document, and quantitative measures of literacy lie near the upper end of level 2 ("low"). Adults employed at the time of the survey average 10 to 13 points higher than all adults, yet approximately 40 percent of rural workers scored in the very low or low ranges (levels 1 - 2) and appear to have limited abilities to use written and quantitative materials (fig. 1). These workers may become trapped in low-skill and low-paying jobs because they are unable to qualify—or even train—for better paying and higher skill jobs. Nearly half of all nonmetro adults, who represent the total potential rural workforce, score in the very low or low ranges.

Do limited literacy proficiencies represent a significant economic handicap for rural workers? The implications of rural literacy scores for rural areas' ability to compete economically can best be assessed by comparing rural and urban scores. Nonmetro literacy skills are somewhat lower than metro, particularly when comparing suburban metro areas with the most rural of the nonmetro areas (table 2). This gap suggests that the most rural areas may have a workforce literacy problem when competing with urban, particularly suburban, areas. Rural-urban comparisons of the distribution of workers across the five performance levels also indicate a significant rural deficit in the two highest performance levels. For example, 28 percent of employed metro adults had high or very high prose literacy scores compared with 19 percent of nonmetro adult workers (table 1).

Older, Southern, and Black Rural Adults Have the Widest Literacy Gaps

Do all rural adults have a literacy problem, or only certain groups? For simplicity, we focus on average prose scores for all adults in looking at subsectors of the rural population. Unless otherwise noted, similar conclusions hold for document and quantitative literacy, the distribution of individuals across literacy performance levels, and the employed workforce.

Perhaps of the greatest importance, the rural literacy gap is nonexistent for younger adults (table 3). The rural gap in average prose scores is limited to individuals age 60 and older, many of whom are no longer in the active workforce. Nonmetro document and quantitative

SCANS Skills

The Secretary of Labor's Commission on Achieving Necessary Skills (SCANS) identified eight areas of workplace know-how that workers need for solid job performance. Those skills are grouped into five competencies and three foundational skills.

Workplace Competencies

Effective workers can productively use:

- Resources—They know how to allocate time, money, materials, space, and staff.
- Interpersonal skills—They can work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds.
- Information—They can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.
- Systems—They understand social, organizational, and technological systems, can monitor and correct performance, and can design or improve systems.
- Technology—They can select equipment and tools, apply technology to specific tasks, and maintain and troubleshoot equipment.

Foundational Skills

Competent workers in the high-performance workplace need:

- Basic skills—reading, writing, arithmetic and mathematics, speaking, and listening.
- Thinking skills—the ability to learn, to reason, to think creatively, to make decisions, and to solve problems.
- Personal qualities—individual responsibility, self-esteem and self-management, sociability, and integrity.

Source: U.S. Department of Labor, Secretary's Commission on Achieving Necessary Skills, *Learning a Living: A Blueprint for High Performance*, April 1992, p. xiv.

scores lag metro for individuals age 35 and older, however, an age range that includes the majority of the workforce. Even among young adults (ages 25-34) the share with high or very high literacy is lower in nonmetro areas, probably reflecting their lesser college and post-graduate education (table 1). Despite these qualifications, it is clear that the rural-urban literacy gap is primarily due to older workers.

Rural literacy scores are neither consistently higher nor lower than urban scores controlling for the educational level of the respondents (table 3). This finding helps to explain the age patterns noted above, because older rural individuals completed their schooling at a time when rural primary and secondary education had not caught up to urban education. The fact that younger rural cohorts more closely resemble their urban counterparts in both secondary education and literacy suggests that the rural literacy gap is closing, but may not fully vanish if urban youths continue to receive more college-level education.

Nonmetro residents in the West actually score higher than metro residents in that region. In the South, nonmetro residents score 21 points lower than their metro counterparts. By race, White nonmetro residents score 15 points below White metro residents and Black nonmetro residents score nearly 30 points below their urban counterparts. However, Hispanic nonmetro residents score over 20 points better than metro Hispanics, many of whom are recent immigrants with limited English proficiency. (There were not enough nonmetro Asians in the NALS data set for us to accurately measure their achievement.) Younger (25-34 year olds) nonmetro Southerners and Blacks have made considerable gains over older cohorts and closed part of the gap with their urban counterparts, but still have below-average literacy.

Table 1

Literacy scores by nonmetro/metro status, employment status, and age, 1992

About half of nonmetro adults had very low or low literacy, but employed and young adults scored higher

Item	Mean test score	Distribution by literacy levels: Level 1 (very low) 0-225	Level 2 (low) 226-275	Level 3 (medium) 276-325	Level 4 (high) 326-375	Level 5 (very high) 376-500
	Points	Percent				
Total adult population:						
Prose proficiency						
Metro	274.0	20.4	25.7	32.0	18.4	3.4
Nonmetro	268.5	20.6	30.6	32.9	13.8	2.1
Document proficiency						
Metro	268.3	22.6	27.3	30.9	16.5	2.6
Nonmetro	262.1	24.5	30.8	30.5	12.6	1.6
Quantitative proficiency						
Metro	272.2	21.9	24.9	30.3	18.4	4.5
Nonmetro	268.4	21.5	28.2	32.6	15.0	2.6
Employed adults:						
Prose proficiency						
Metro	288.6	13.4	22.9	35.6	23.3	4.8
Nonmetro	281.7	13.4	26.8	40.6	16.2	2.9
Document proficiency						
Metro	284.3	14.2	25.4	35.2	21.5	3.7
Nonmetro	276.6	15.9	29.3	36.2	16.6	2.0
Quantitative proficiency						
Metro	289.2	13.3	23.9	33.6	23.3	5.9
Nonmetro	283.6	13.5	26.1	37.5	19.3	3.5
Young adults, ages 25-35:						
Prose proficiency						
Metro	282.4	16.8	23.0	34.4	21.6	4.2
Nonmetro	283.3	12.4	31.0	35.5	17.9	3.2
Document proficiency						
Metro	281.3	16.6	24.2	34.3	21.3	3.8
Nonmetro	281.1	13.7	30.1	37.3	16.4	2.5
Quantitative proficiency						
Metro	280.9	18.0	23.0	33.2	20.4	5.4
Nonmetro	283.7	15.0	28.0	35.9	17.1	4.0

Source: Calculated by authors using data from the 1992 National Adult Literacy Survey.

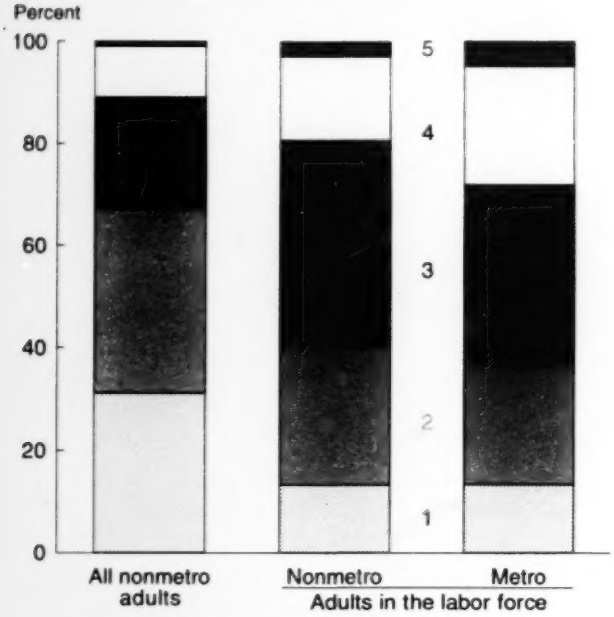
Determinants of Literacy and the Rural Literacy Gap

Scores from the NALS indicate that rural literacy levels are modestly lower than urban—particularly suburban—literacy levels. The association between lower literacy and rural residence is somewhat difficult to interpret, however, because literacy levels vary strongly across demographic groups and regions. We use regression analysis to help sort out these complex relationships and shed additional light on the extent, causes, and consequences of rural deficits in literacy skills (see "Data and Methods," p. 51, for details on the statistical procedure). To focus on issues related to the adult workforce, we dropped teenagers from our sample when conducting this regression analysis.

Figure 1

Distribution of adults by prose literacy levels, 1992

Nonmetro adults in the labor force score higher than all nonmetro adults, but lower than metro adults in the labor force



Source: Calculated by authors using data from the National Adult Literacy Survey.

When the three literacy scores are regressed on residence indicators alone, the associated coefficients correspond to total area differences in mean literacy. For example, mean prose scores for adults age 20 and older were 6.2 points higher among metro than nonmetro residents. Similarly, residents of the largest central cities and their suburbs had mean prose scores 9.2 and 21.8 points higher than residents in the most rural counties.

After controlling for other characteristics of the respondents—including age, gender, marital status, education, parents' education, race, ethnicity, foreign or native-born, native speaker of English or not, and region of resi-

Table 2

Average literacy scores by rural-urban continuum, 1992

Literacy is highest in suburban counties and lowest in the most rural counties

Rural-urban continuum	Prose	Document	Quantitative
Metro:			
Central city	272.9	267.4	271.2
Suburban	285.3	279.7	285.7
Medium	273.6	267.1	271.3
Small	275.6	270.3	273.6
Nonmetro:			
Urban, adjacent	273.0	268.0	272.4
Urban, nonadjacent	275.9	268.7	277.0
Less urban or totally rural	264.7	258.3	264.3

Note: See Data and Methods, p. 51, for definitions of continuum groups.

Source: Calculated by authors using data from the 1992 National Adult Literacy Survey.

Table 3

Average prose scores by education, region, race, and ethnicity

The nonmetro-metro literacy gap is largest for older, southern, and Black adults

Item	Metro	Nonmetro
	Points	
Age:		
25-34	282.4	283.3
35-59	279.2	284.0
60 or older	241.1	231.2
Education:		
Some high school	228.8	235.4
High school graduate	267.0	275.8
Bachelor's degree	320.5	324.8
Post-graduate degree	337.0	329.2
Region:		
Northeast	269.4	270.7
Midwest	280.2	277.9
South	273.5	252.2
West	274.0	290.7
Race/Ethnicity:		
White	290.3	275.9
Black	241.4	213.3
Asian/Pacific	241.4	NA
Other	228.9	259.9
Hispanic1	213.7	234.1

[1]Hispanics may be of any race and overlap with the racial categories.

NA - Mean score not reported for nonmetro Asians due to inadequate sample size.

Source: Calculated by authors using data from the 1992 National Adult Literacy Survey.

Table 4

Rural-urban gaps in average adult literacy scores and scores adjusted for respondent characteristics, 1991

Measurable characteristics of the population account for much of the rural gap in literacy

Literacy category	Metro-nonmetro	Excess over less urban and totally rural nonmetro area scores:[1] Metro: Central city	Metro: Suburb	Metro: Medium	Metro: Small	Nonmetro: Urban, adjacent	Nonmetro: Urban nonadjacent
				Points			
Area differences:							
Prose	6.2	9.2	21.8	9.9	11.6	9.4	11.8
Document	7.0	10.4	22.7	9.7	12.6	10.7	11.3
Quantitative	4.3	7.8	22.4	7.5	10.0	9.2	13.3
Area differences adjusted for other respondent characteristics:[2]							
Prose	2.8	4.7	6.7	2.6	4.3	2.9	3.1
Document	2.6	4.1	7.1	1.9	4.1	2.7	2.3
Quantitative	1.0	3.0	5.8	-0.4	0.9	1.3	2.6

Note: Only adults 20 years of age and older were included in this analysis.

[1]See Data and Methods, p. 51 for descriptions of these rural-urban continuum groups.

[2]The regressions contained 33 control variables for individual demographic and other characteristics. See Data and Methods, p. 51 for a fuller description of the variables and the regression model.

Source: Calculated by authors using data from the 1992 National Adult Literacy Survey.

dence—area differences in literacy are reduced by about two-thirds, although still highly statistically significant in most cases. The fact that the control variables "absorb" much of the differences in literacy confirms that the demographic and regional composition of rural populations tends to depress literacy levels compared.

What are the most important demographic characteristics that depress literacy levels in rural areas and are they amenable to policy interventions? Are there any offsetting rural advantages that raise literacy?

Table 5 reports simulated compositional effects for prose literacy (similar conclusions hold for document and quantitative literacy). We report separately composition effects for independent variables for which both the metro-nonmetro difference in data means and the associated coefficient were statistically significant at the 1-percent level. That is, we focus on the largest and most precisely estimated composition effects although we also report the combined effect of all of the other compositional differences.

Two characteristics of the nonmetro population—higher average age and lower average education—significantly lower literacy levels. Individuals' and parents' educational gaps together lower nonmetro prose literacy by 10.4 points, significantly more than the total nonmetro prose gap of 6.2 points.

Some characteristics of the nonmetro population tend to raise literacy scores. Relatively fewer immigrants, ethnic and racial minorities, and non-native English speakers, all groups with below-average (English-language) literacy, live in nonmetro areas. Other small differences in characteristics lower the nonmetro gap a further 0.9 percentage point. Despite these pluses, the net effect of all of the differences in population characteristics that we are able to control for in our regression analysis is to depress nonmetro prose literacy by 3.4 points. The sum of this total compositional effect and the net nonmetro effect, which remains even after introducing the control variables into the model (2.8 points), yields the total nonmetro prose gap of 6.2 points.

In sum, the determinants of literacy are complex. Although literacy tends to be a little lower in rural areas, rural-urban differences in literacy are modest compared with differences in literacy across other groupings, such as education levels, race, and ethnicity. It is important for rural policymakers to take account of the low literacy of much of the rural population and of the demographic and other factors that facilitate or impede the further development of rural literacy. Our finding that the lower educational levels of older rural residents is a source of low literacy suggests—as would be expected—that improved schooling is a powerful cure for low literacy in the long run, a strategy that most rural school districts are already pursuing. Remedial basic skills programs for workers with inadequate literacy skills would be needed to attack

the core of the current rural literacy gap. It is a cause for concern that very few workers participate in basic skills programs and that nonmetro participation is a little lower than metro (fig. 2).

Literacy Skills and the Demand for Labor

How much of a demand is there for literacy skills and do rural and urban areas differ in their levels of demand for these skills? To begin with, individuals with greater literacy skills are more likely to be employed and earn higher wages when employed (fig. 3). Do these associations indicate a large labor market payoff to bettering one's literacy skills? It is plausible that many employers value literate workers and pay a premium to recruit them. However, individuals scoring well on the NALS test also tend to have characteristics beyond literacy that employers value, such as college degrees. Multivariate analysis can help to isolate the true contribution of literacy to labor market rewards.

Table 5

The contribution of differences in population characteristics to the nonmetro-metro gap in average adult prose literacy scores, 1991

Historically lower rural education is still the most important source of lower rural literacy

Characteristic	Contribution to metro-nonmetro gap
	Points
Characteristics associated with lower nonmetro prose literacy:	
Older	1.0
Less educated—	
Own education	8.5
Parents' education	1.9
Characteristics associated with higher nonmetro prose literacy:	
Fewer immigrants	-2.1
Fewer Blacks	-1.0
Fewer Hispanics	-1.6
Fewer non-native English speakers	-2.4
Other (individually small) differences in characteristics	-.9
Total compositional effect	3.4
Gap net of compositional effects	2.8
Total gap	6.2

Note: Only adults 20 years of age and older were included in this analysis. The regression upon which these results are based contained 33 control variables for demographic and other individual characteristics. See Data and Methods, p. 51 for a fuller description of the variables and the regression model.

Source: Calculated by authors using data from the 1992 National Adult Literacy Survey.

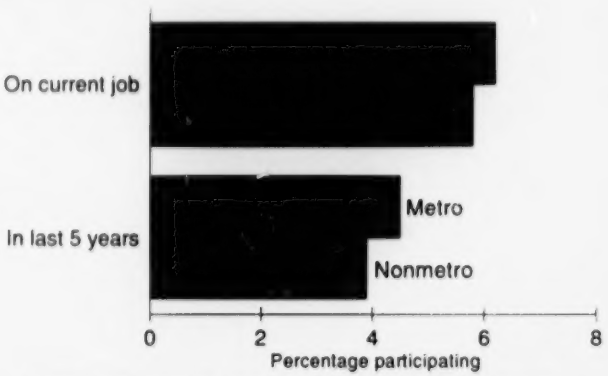
We estimated regression models of individual employment status and earnings, which included NALS literacy scores, along with an extensive list of human capital and other control variables widely used by social scientists to predict labor market outcomes. Table 6 reports regression-corrected estimates of the impact of a 100-point increase in a literacy score on weekly and annual measures of both employment and earnings. A 100-point rise in a NALS score corresponds to a two-level increase, for example, from level 2 ("low") to level 4 ("high"). Controlling for other determinants of labor market status reduces the magnitude of the association between literacy and employment outcomes by about half, but the remaining association is highly statistically significant and of an economically important magnitude, particularly for wages. Everything else—including education—equal, a worker with level 4 prose literacy skills tends to earn $120 a week ($6,067 a year) more than a worker with level 2 prose literacy. This finding supports the hypothesis that good literacy skills are amply rewarded in the labor market.

Even though the labor market payoff to literacy is high, the nonmetro gap in average literacy skills only accounts for a small share of the nonmetro gap in earnings, because nonmetro literacy levels are only a little lower than metro, while nonmetro earnings are substantially lower than metro. For example, our regression results imply that only approximately $9 of the $128 gap in average weekly earnings in 1992 can be attributed to the 7.3-point gap in average prose literacy for employed adults. (The 7.3 point prose gap for employed adults is a little higher than the 6.2-point gap for all adults.)

Figure 2

Share of the workforce participating in basic skills programs

Fewer nonmetro than metro workers participate in basic skills training



Source: Calculated by the authors using data from the January 1991 Current Population Survey for training on the current job and data from the 1992 National Adult Literacy Survey for training within the last 5 years.

Data and Methods

The 1992 National Adult Literacy Survey was a collaborative project of the U.S. Department of Education and the Educational Testing Service. Each of the approximately 25,000 adults interviewed was administered three tests designed to measure prose, document, and quantitative literacy by simulating tasks likely to be encountered in actual life. By measuring document literacy—which includes using tables and graphs—and quantitative literacy, the NALS test expands traditional conceptions of literacy to encompass the skills recently named "numeracy."

To capture the continuous progression in respondents' information processing skills and strategies, their performances on the exams were summarized by scaled scores, ranging from 0 to 500. Scores are grouped into five levels, ranging from level 1, representing very low proficiencies (0 to 225), to level 5, representing very high proficiencies (376 to 500). For example, in document literacy, level 1 suggests an ability to locate an expiration date on a driver's license but likely inability to enter background information correctly on an application for a Social Security card. Level 5 in document literacy indicates the ability to use a table depicting survey results about parental involvement in school to write a paragraph summarizing the extent to which parents and teachers agree. For a fuller discussion of the NALS survey design and literacy measures, see U.S. Department of Education report listed in For Further Reading, p. 52.

The NALS also included an extensive set of background questions that recorded detailed demographic, economic, and other information on each respondent. Of crucial importance, we are also able to distinguish levels of urbanization because we can identify the county of residence for each respondent. We used this background information to investigate the extent, causes, and implications of rural-urban differences in literacy.

In much of our analysis, we define rural individuals as those living in nonmetro counties and urban individuals as those living in metro counties. When feasible, we also used the Economic Research Service's Rural-Urban Continuum Codes, which provide a more detailed categorization of urbanization (see the report by Butler and Beale in For Further Reading, p. 52). The four subcategories of metro counties are: central counties of metro areas of 1 million population or more ("central city"); fringe counties of metro areas of 1 million population or more ("suburb"); counties in metro areas of 250,000 to 1 million population ("medium"); and counties in metro areas of fewer than 250,000 population ("small"). Due to insufficient sample sizes, we grouped the six nonmetro continuum codes into three subcategories: urban population of 20,000 or more, adjacent to a metro area ("urban, adjacent"); urban popuiation of 20,000 or more, not adjacent to a metro area ("urban, nonadjacent"); and all other counties ("less urban or totally rural").

Regression Models of Characteristics Affecting Literacy

Multivariate regression techniques allow us to investigate the factors affecting literacy in rural and urban areas more fully than simple tabulations. First, we regressed individual literacy scores on either a dummy variable for metro county or five dummy variables for the most urban county types from our modified rural-urban continuum (all except "less urban or totally rural"). The resulting coefficients measure the extent to which mean literacy is higher in more urban counties than in the most rural counties, in other words, the corresponding rural literacy gap. Second, we reestimated these models adding 33 independent variables measuring age, gender, marital status, education, parents' education, race, ethnicity, whether a native-born American or a native speaker of English, and region. The regression coefficient for an urbanization variable now represents the rural literacy gap after standardizing the rural and more urban populations with respect to the characteristics measured by the 33 additional independent variables. The regression coefficient corresponding to one of these additional independent variables estimates the impact of that characteristic on literacy, holding all other characteristics and urbanization fixed. Finally, we used these coefficients to simulate the contribution of rural/urban differences in the prevalence of these characteristics to the rural literacy gap. The product of the metro-nonmetro difference in the mean value of a population characteristic with the corresponding coefficient is the regression model's estimate of how that difference in population composition either widens or narrows the rural gap in average literacy.

Regression Models of Employment Status and Earnings

We used similar regression techniques to investigate the effect of literacy on employment status and earnings. We regressed individual employment status or earnings on a literacy score plus 24 control variables for labor market experience, gender, marital status, education, race, ethnicity, whether a native-born American or a native speaker of English, and region. The models estimated for the total United States also included a control variable for metro residence. The regression coefficient of the literacy variable estimates the impact of literacy on the dependent variable, for example weekly earnings, holding the other 24 characteristics fixed. This should provide a good estimate of the labor market premium to increasing literacy, because the additional control variables capture a wide range of factors shown by previous research to influence an individual's employment and earnings.

The labor market rewards for literacy are substantially lower in nonmetro labor markets than in metro labor markets. For example, a 100-point increase in prose literacy is associated with a $133 increase in weekly earnings for metro workers, but only a $66 increase for nonmetro workers. Similarly, the probability of employment rises less strongly with literacy for nonmetro workers. Both of these patterns suggest that the demand for workers with good literacy skills is considerably lower in nonmetro than in metro labor markets. Relatively low labor market rewards for literacy, in turn, probably tend to depress rural literacy because individuals have less incentive to develop these skills, while those who have high literacy gravitate to urban jobs.

Job skill requirements from the Dictionary of Occupations Titles (DOT) indicate that the skill levels of jobs held by rural workers at a given literacy level tend to be substantially lower than the skill levels of jobs held by corresponding urban workers. Over-qualification, where the skills of the worker appear to exceed the skills of the job, also is more common in rural areas. Despite their relative scarcity, highly skilled rural workers have a more difficult time than their urban counterparts in finding jobs that make full use of their skills.

Conclusion

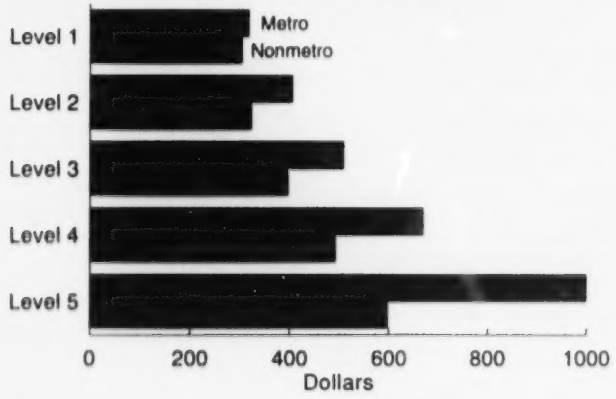
On the supply side, there is a modest gap between the literacy of the rural and urban adult workforces as a whole, which is largely attributable to older workers who grew up at a time when rural education lagged urban. The rural-urban literacy gap is much smaller for young workers, suggesting that, over time, the gap in average literacy skills will be erased, though the gap at the high end of the literacy distribution may remain. The very low rate of participation of adult workers in basic skills programs is a cause for concern, because it is precisely such programs that have the potential to reach the individuals with the greatest literacy deficits.

The more general literacy problem for rural workers lies on the demand side. There are still relatively few high-skill, high-wage jobs available to reward rural workers for the skills they have today and those they are likely to acquire. Thus, generating an adequate supply of these jobs is as much a concern for rural policymakers as is increasing literacy. Without jobs requiring more literate workers, efforts to improve literacy and numeracy may still leave rural areas with less literate workers as the more literate seek urban jobs commensurate with their skills.

Figure 3

Average weekly earnings by prose literacy levels, 1992

The gap between nonmetro and metro workers' earnings increases as the literacy level increases, suggesting lower demand for advanced literacy skills by rural employers



Source: Calculated by authors using data from the National Adult Literacy Survey.

For Further Reading. . .

M. A. Butler and C. L. Beale, *Rural-Urban Continuum Codes for Metro and Nonmetro Counties, 1993*, USDA-ERS-RED, Washington, DC, Sept. 1994.

U.S. Department of Education, National Center for Education Statistics, *Adult Literacy in America*, Sept. 1993.

U.S. Department of Labor, Secretary's Commission on *Achieving Necessary Skills, Learning a Living: A Blueprint for High Performance*, April 1992.

Paul L. Swaim

Job Training Lags for Rural Workers

Post-school training is an important component of the rural workforce skill development system, but, in 1991, just 40 percent of the nonmetro workforce had received training on their current jobs. Less educated, minority, and southern rural workers were particularly unlikely to be enhancing their skills. Between 1983 and 1991, the training rate for nonmetro workers rose modestly, but fell behind the more rapidly rising metro training rate, suggesting that fewer rural firms had adopted the high-skill production strategies widely believed to be of increasing importance for competitive success. Lower rural training reflects both the specialization of rural firms in more routine products and technologies and the cost disadvantages of rural firms and communities as suppliers of job training.

INTENSE global economic competition, rapid changes in technology, and the dissemination of "high-performance" work practices all suggest that workers with advanced skills have the best chances of enjoying high wages and job security. The rural workforce has historically been less educated than its urban counterpart, and rural workers were especially hard hit by economic restructuring during the 1980's. These trends suggest that many rural workers may not have enough of the right skills to compete for good jobs. Inadequate workforce skills may cloud the economic development prospects of many rural areas, while rural areas with the most highly skilled workforce enjoy their competitive advantage.

A comprehensive assessment of rural workforce skills cannot be limited to traditional schooling because job skills are not limited to the academic skills emphasized in school. A bachelor's or professional degree is the key qualification for entry-level jobs in professional, technical, and managerial occupations. Even in these education-intensive occupations, workers typically require considerable in-service training and on-the-job experience to hone their job skills and become fully productive. For the rest of the workforce, apprenticeships and other forms of company-based training may play an even greater role in the development of job skills. Although on-the-job learning has always been an important part of the workforce training system, the importance of post-school vocational training may be increasing. Accounts of the emerging sources of competitive advantage in manufacturing and other sectors have emphasized the need to reorganize businesses as sites of continuous learning. Career-long employee training is seen as a key component of these high-performance competitive strategies (Dertouzos, Lester, and Solow; Office of Technology Assessment; Commission on the Skills of the American Workforce).

I use data from the job training supplements to the January 1983 and 1991 Current Population Surveys (CPS) to analyze the vocational skills of rural workers and their participation in post-school job training (see Data and Methods, p. 60, for more details). I assess rural training patterns from the perspective of both rural workers and rural firms. From the perspective of rural workers, I examine how the access to vocational training differs, both among rural workers and between rural and urban workers. From the perspective of rural firms, I examine the extent to which these firms are pursuing competitive strategies that emphasize recruiting or training a highly-skilled workforce. Barriers confronting rural firms and communities, as suppliers of job training, are also discussed.

Paul Swaim is an economist at the Organization for Economic Cooperation and Development, Paris, France.

Job Training, Productivity, and Competitiveness

The recruitment, promotion, and pay policies of firms attest to the importance of job skills learned after the completion of formal schooling. Workers' earnings typically rise quite dramatically during their careers, suggesting that they are acquiring and refining skills employers value. For example, firms tend to recruit or promote experienced workers with good references to fill the most demanding and best paying jobs. Economists call investments in learning new skills—through both traditional schooling and post-school job training—human capital investments. Although exact magnitudes are difficult to pin down, a large body of research suggests that human capital investments are an important source of productivity gains and longrun economic growth. These studies also indicate that the productivity gains from human capital acquired through post-school job training are about as large as those from formal schooling. Career-long learning makes an important contribution to rising living standards, both for individual workers and for the Nation as a whole.

Some analysts believe that the economy is restructuring in ways that increase the importance of job training. Several recent studies conclude that extensive training of the workforce is essential for firms to compete successfully in international markets on a basis other than low wages (Dertouzos, Lester, and Solow; Office of Technology Assessment; Commission on the Skills of the American Workforce). The high-skill, high-wage competitive strategies heralded by these analysts were distilled from case studies of firms that have achieved impressive capacities for continuous innovation, quality control, and responsiveness to individual customers' needs. Computer, communication, and other advanced technologies are often necessary to achieve flexible, high quality production. Major changes in organizational structure and business practices are also typically required, because the firm must create an environment that nurtures continuous learning and decentralized problem solving. The exact recipe for "high performance" work organizations varies, but extensive in-house training is almost invariably part of the mix (Ichniowski and Shaw).

A prosperous, high-skill future is not guaranteed for all workers, particularly not for all rural workers. Some analysts caution that only a small proportion of—mostly urban—firms have embraced the high performance model and emphasize that wages have deteriorated for many—especially less educated—workers (Commission on the Skills of the American Workforce, Teixeira and Mishel). A second concern is that the economy may offer diminished job security. Both the upsurge of bankruptcies and plant closings during the recessions of the 1980's and more recent waves of corporate "downsizing" have displaced many midcareer workers. These workers often have poor prospects of finding comparably paying jobs without additional education or training.

Both the perennial relationship between human capital investments and higher productivity and wages and the more recent economic restructuring emphasize the importance of job skills learned after leaving school, suggesting that a chief determinant of the economic prospects of rural areas will be their capacities to upgrade local workforce skills. Schools play a critical role as the providers of foundational skills—including developing the ability to learn—required by a productive workforce. Two- and 4-year colleges and vocational schools also play important roles in training adult workers, as do government training programs. Nonetheless, employers typically are the lead actors in an area's training system, both as suppliers of training to their workers and in their choices about how skills are used and rewarded within their businesses. The training practices of rural firms, accordingly, provide a valuable gauge of their competitive strategies and prospects. The economic outlook for rural workers and communities is closely tied to those strategies and prospects.

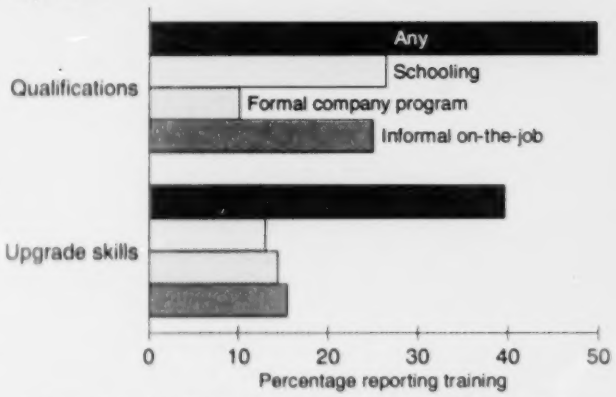
How Rural Workers Get Their Training

Both traditional schooling and enterprise-based training are important sources of the skills used by nonmetro workers on their jobs (fig. 1). Schools were the most frequently cited source of the qualifying skills workers needed to obtain their jobs (27 percent of hires), but enterprise-based training was also important. Twenty-five percent of nonmetro workers reported that informal on-the-job training (OJT) was a source of hiring qualifications while 10 percent acquired qualifications through formal company training programs. Not surprisingly, enterprise-based

Figure 1

Share of nonmetro workers reporting training used to qualify for or upgrade skills on current job, 1991

Both schooling and post-school training are important sources of job skills



Source: Calculated by author using data from the January 1991 Current Population Survey.

training was even more important as a source of skill-upgrade training after being hired, although employers made considerable use of schools to train incumbent workers.

The training glass is also half empty. Fifty percent of nonmetro workers reported their jobs did not require any qualifying training and 60 percent that they had received no training since being hired, suggesting that many low-skill jobs remain. This interpretation is consistent with Teixeira and Mishel's study which concluded that many workers—especially rural workers—continue to be employed in low-skill occupations, some of which are among the occupations forecast to add the most jobs in coming years.

Table 1

Workforce training and wage premiums by residence, 1983 and 1991

Post-school training is an important component of the workforce skill development system

Type of training	Nonmetro		Metro	
	1983	1991	1983	1991
	Percent			
Share of workforce with:[1]				
Hiring qualifications for current job–				
Any	51.7	49.9	58.3	58.5
Schooling	25.5	26.5	31.7	34.1
Formal company training	8.4	10.2	10.6	13.3
Informal on job training	26.2	25.1	29.1	28.1
Training on current job–				
Any	36.8	39.7	36.8	43.0
Schooling	11.5	13.1	12.6	13.5
Formal company training	11.7	14.5	12.3	18.0
Informal on job training	15.7	15.5	15.2	16.9
Estimated wage premium for training:[2]				
Hiring qualification–				
Any	16.8	13.8	20.7	21.2
Schooling	13.7	14.3	17.4	22.8
Formal company training	14.3	18.4	12.5	13.0
Informal on job training	10.3	4.7	11.2	6.8
Training on current job–				
Any	6.3	10.2	7.5	8.9
Schooling	3.1	1.8	6.2	6.2
Formal company training	12.5	17.7	12.3	14.9
Informal on job training	2.8	6.0	1.8	0.8

[1]Workers could report more than one type of training or qualifications, so percentages by type add to more than the total percentages receiving any training or having any qualifications.

2Calculated from coefficients on regressions that control for the effects of the variables listed in the Data and Methods, p. 60.

Source: Calculated by the author using data from the January 1983 and 1991 Current Population Surveys.

Qualifications and Training Pay Off

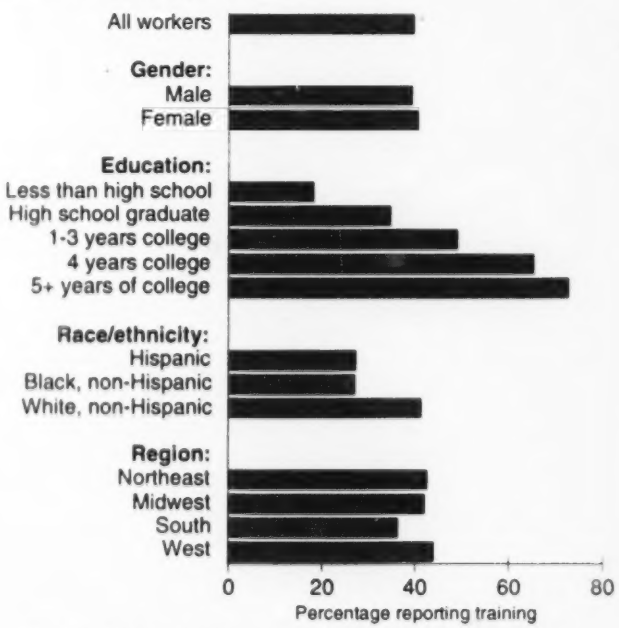
Nonmetro workers who cited hiring qualifications or obtained upgrade training are paid more than other workers, suggesting that the training activities developed skills that employers value (table 1). I estimated the labor market premium for the skills learned from training by controlling for education and other factors that affect an individual's wages. (See Data and Methods, p.60, for a listing of the factors included and an explanation of the regression method used.) The wage premiums after controlling for the other factors are substantial—14 percent for qualifications and 10 percent for training in 1991.

When I estimated separate premiums for training provided by schools, formal company programs, and OJT, formal company training programs result in the largest wage gains (18 percent). Employers apparently believe that trained workers have acquired valuable skills, especially

Figure 2

Share of nonmetro workers reporting training bygender, education, race/ethnicity, and region, 1991

Smaller shares of less educated, minority, and southern workers received training to upgrade skills on their current jobs



Source: Calculated by author using data from the January 1991 Current Population Survey.

aged by the firm. Viewed from a different perspective, a good way to identify firms whose competitive strategies emphasize workforce skills is to identify firms who have developed formal training programs for their workers or who aggressively recruit and reward highly skilled workers.

Which Rural Workers Get Training and of What Sort?

The CPS data indicate that uneven access to skill-upgrade training should be of concern. Less educated workers receive much less post-school training than better educated workers and may become trapped in low-skill jobs. Just 18 percent of rural high school dropouts reported receiving training on their current job, compared with 73 percent of workers with post-graduate education (fig. 2). Training rates are also low for racial and ethnic minorities. Only about 25 percent of rural Blacks and Hispanics report any training on their job compared with 41 percent of other (predominantly White) rural workers. Finally, training rates are lower in the rural South where educational attainment is lowest and most nonmetro Blacks and Hispanics live. These patterns suggest that enterprise-based training is least available to the least skilled rural workers who may be in greatest need of improved vocational skills. They also suggest that the lower educational attainment of the rural workforce constitutes a barrier to post-school job training.

The training received by rural workers is quite diverse (table 2). Among workers receiving training, 24 percent received training in managerial and supervisory skills, 29 percent in computer skills, and just 15 percent in reading, writing, or math skills. Two-thirds of the workers characterized their training as covering "other technical skills" specific to their occupation. The mix of skills targeted by training provides a useful reminder of the diversity and specificity of much job training, and of the limited overlap between post-school job training and academic schooling.

Firms also provide training in a variety of formats, with informal OJT (39 percent), formal company training (37 percent), and schools (33 percent) all playing important roles (table 2). Traditional apprenticeships account for surprisingly little (4 percent) of the formal training offered by firms. Public job training programs, such as those funded under the Job Training Partnership Act (JTPA), also account for only a small share of the training received by incumbent workers. The larger public role takes the form of 2- and 4-year colleges providing employees with opportunities to upgrade their skills. Public higher education appears to be an especially effective source of training for the incumbent workforce when schools tailor their offerings to the needs of specific firms or industries and offer the training as part of a more comprehensive package of industrial extension services (Rosenfeld). In other words, public policies to enhance job training work best when they form effective partnerships with private employers, who typically are the lead actors in a highly decentralized training system.

Rural Training Up Slightly Between 1983 and 1991

The share of nonmetro workers receiving training on their jobs rose 3 percentage points between 1983 and 1991, from 37 to 40 percent (table 1). The share participating in formal company training programs also rose 3 percentage points, from 12 to 15 percent. Another indication that rural firms were demanding more skilled workers is that the estimated wage premium for training increased from 6 to 10 percent, despite the increase in the supply of trained workers. Nonetheless, the modest increases in training rates suggest that most rural firms and workers were not participating in the "high-performance" transformation by 1991. This conclusion is reinforced by the observation that hiring requirements did not increase—58 percent of workers reported qualifications in both years.

Table 2

Types and sources of skill-improvement training, 1991[1]

Nonmetro workers receive less managerial and computer training and are less likely to receive training in formal company programs or 4-year colleges

Training type/provider	Nonmetro	Metro
	Percent of all workers reporting training	
Type of training:		
Managerial	23.7	27.9
Computer	29.3	34.7
Academic[2]	14.6	14.5
Other technical skills	66.4	66.9
Training provider:		
School	33.3	32.0
Formal company program	37.1	42.5
Informal, on the job	39.4	39.7
Other	14.8	15.0
If school:		
High school vocational program	4.0	4.4
Private vocational school	13.3	9.7
2-year college	41.5	41.0
4-year college	46.8	50.5
JTPA[3]	3.7	4.9
If formal company program:		
Apprenticeship	4.2	4.1
JTPA[3]	5.1	4.5

[1]Workers could report more than one type of training or more than one training provider, so percentages may add to more than 100 percent of workers reporting training.

[2]Academic programs are in reading, writing, or mathematics.

[3]JTPA are programs supported by the Federal Job Training Partnership Act.

Source: Calculated by the author using data from the January 1991 Current Population Survey training supplement.

The share of workers receiving training through formal company training programs or schools increased between 1983 and 1991, while the share reporting informal OJT fell slightly. This shift in the mix of training types is consistent with the predicted change in the composition of job skills required by the new competitive strategies and production technologies, but again the shifts are modest. Higher order cognitive skills, such as the abilities to synthesize information from a number of different sources and to engage in nonroutine problemsolving, are at a premium in high performance work organizations and are probably best taught in classrooms or other formal programs, away from the job. By contrast, informal OJT is particularly effective for learning the more routine or manual skills emphasized by traditional, "mass production" firms.

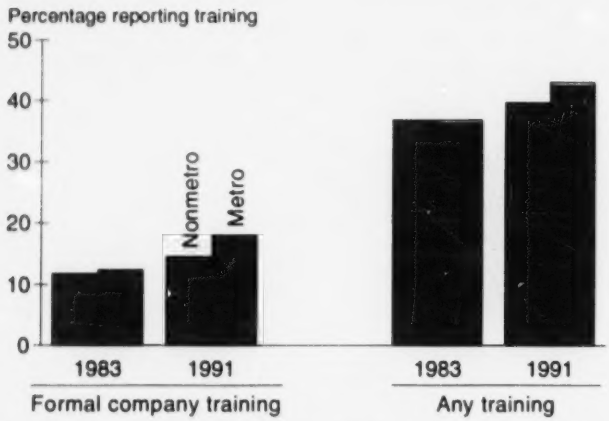
Rural Training Lags Urban

Rural workers do not receive as much skill-upgrade training from their employers as urban workers. The rural training deficit was fairly small—40 percent of nonmetro compared with 43 percent of metro workers received training on their current job in 1991 (fig. 3). It is worrisome, however, that this gap emerged between 1983 and 1991, a period in which metro training rates rose much faster than nonmetro. The rural-urban gap was even larger for formal company training programs, probably a better indication of restructuring than all training is. An increasing share of U.S. employers appear to believe that their long-run competitive standing requires increased investment in workforce training, but these employers are disproportionately located in urban areas.

Figure 3

Share of workers reporting training by type of program and residence

Metro training rates increased more rapidly than nonmetro rates during the 1980's



Source: Calculated by author using data from the January 1983 and 1991 Current Population Surveys.

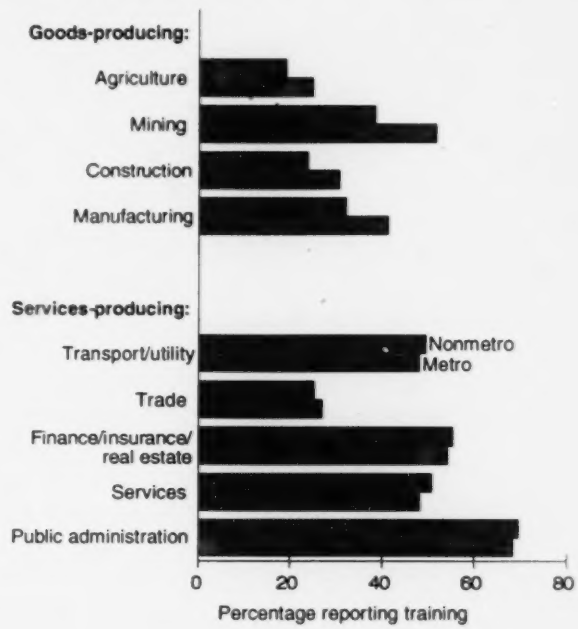
Metro employment is more concentrated in the training-intensive services-producing industries, such as finance and public administration, than nonmetro employment (fig. 4). Lower nonmetro training rates are thus partly attributable to differences in broad sectoral mix. A nonmetro-metro training gap is also evident, however, within the goods-producing industrial sectors of agriculture, mining, construction, and manufacturing. Recent discussions of international competition and high-performance work practices suggest that manufacturing is a particularly interesting sector to analyze more closely. Manufacturing also employs a substantial share of the rural workforce.

Higher metro training rates in manufacturing reflect both a concentration of the most technologically complex manufacturing industries at urban sites and a division of labor within individual industries, with the most skill and training intensive jobs located in urban areas. Complex manufacturing accounted for 51 percent of metro manufacturing employment compared with just 27 percent of nonmetro manufacturing employment in 1991 (table 3). As would be expected, training rates were substantially higher for complex manufacturing. Yet, only about one-third (2.9 percentage points) of the 9.2 percentage-point nonmetro-metro manufacturing training gap was due to the

Figure 4

Share of workers reporting training by industry and residence, 1991

Fewer nonmetro than metro workers in goods-producing industries receive training to upgrade their skills



Source: Calculated by author using data from the January 1991 Current Population Survey.

lower share of nonmetro employment in complex manufacturing. The remaining two-thirds of the gap reflected lower nonmetro training rates within complex and routine manufacturing. Three-quarters of the nonmetro-metro gap for formal company training programs was due to lower nonmetro training rates within the two manufacturing subsectors.

Rural-urban differences in occupational mix also indicate a spatial division of labor within complex and routine manufacturing that concentrates the most skilled jobs in urban areas. Managerial, professional, and technical workers, who are more educated and have higher training rates than other broad occupational groups, accounted for 37 percent of metro employment in complex manufacturing in 1991, compared to just 18 percent of nonmetro employment. These training intensive occupations account for 17 percent of metro and 8 percent of rural employment in routine manufacturing.

The types of training provided to rural workers also differ in several respects from those provided to urban workers (table 2). One difference is that nonmetro workers receive less training in managerial and computer skills than metro workers, reflecting the concentration of managerial and the most technically advanced production activities at urban production sites. Nonmetro workers are also less likely to participate in formal company training programs. This is probably due, at least in part, to the smaller size of rural firms (fig. 5). Most small firms cannot afford to establish formal training programs and must instead rely on either informal instruction from co-workers or external training providers. Among external providers, nonmetro firms differ from metro employers by relying more on vocational schools and less on four-year colleges. Rural firms are less likely to be located near 4-year colleges and universities that can provide advanced training for their workforce, but appear to have more access to vocational schools (see Gibbs' article on page 37).

Factors Depressing Rural Training

These CPS data suggest that rural firms train less than urban firms because their jobs are less technical and require less training to perform. The example of manufacturing demonstrates that the spatial division of labor results in relatively low demand for skilled workers and, hence, for training at rural plants. Rural firms may also train less because the per unit cost for training a rural worker may be high. Rural workers are generally less educated than urban workers (and less literate, see Greenberg, Swaim, and Teixeira's article on pages 45-52) and, hence, would require more training to progress to more technical jobs. Smaller rural firms and less access to external training providers, especially colleges, that could train workers from multiple employers, may also increase unit costs that also depress rural training rates.

The multiplicity of factors depressing rural training suggests that no single policy intervention is likely to equalize training access for rural workers. Measures, such as industrial extension programs, that encourage rural firms to adopt new processes or procedures that require more highly skilled workers would also increase their demands for a trained workforce and encourage increased investment in training. Policies that directly supply training services to rural firms or lower the costs to these firms of developing their own training programs also have a role to play.

Table 3

Training in manufacturing by residence, 1991

The concentration of complex manufacturing in urban areas contributes to higher training rates for metro workers

	Workers receiving training on their current job:							
	Any training			Formal company training program			Distribution of manufacturing jobs	
Item	Nonmetro	Metro	Gap	Nonmetro	Metro	Gap	Nonmetro	Metro
	Percent		Percentage points	Percent		Percentage points	Percent	
Type of manufacturing:								
Routine	28.9	33.2	4.3	11.1	13.4	2.3	73.3	49.4
Complex	41.1	49.1	8.0	18.0	25.8	7.8	26.7	50.6
Total manufacturing:								
Actual training rate	32.2	41.4	9.2	12.9	19.8	6.9	100	100
Rate using metro job distribution	35.1	41.4	6.3	14.6	19.8	5.2	NA	NA
Reduction in metro-nonmetro gap	NA	NA	2.9	NA	NA	1.7	NA	NA

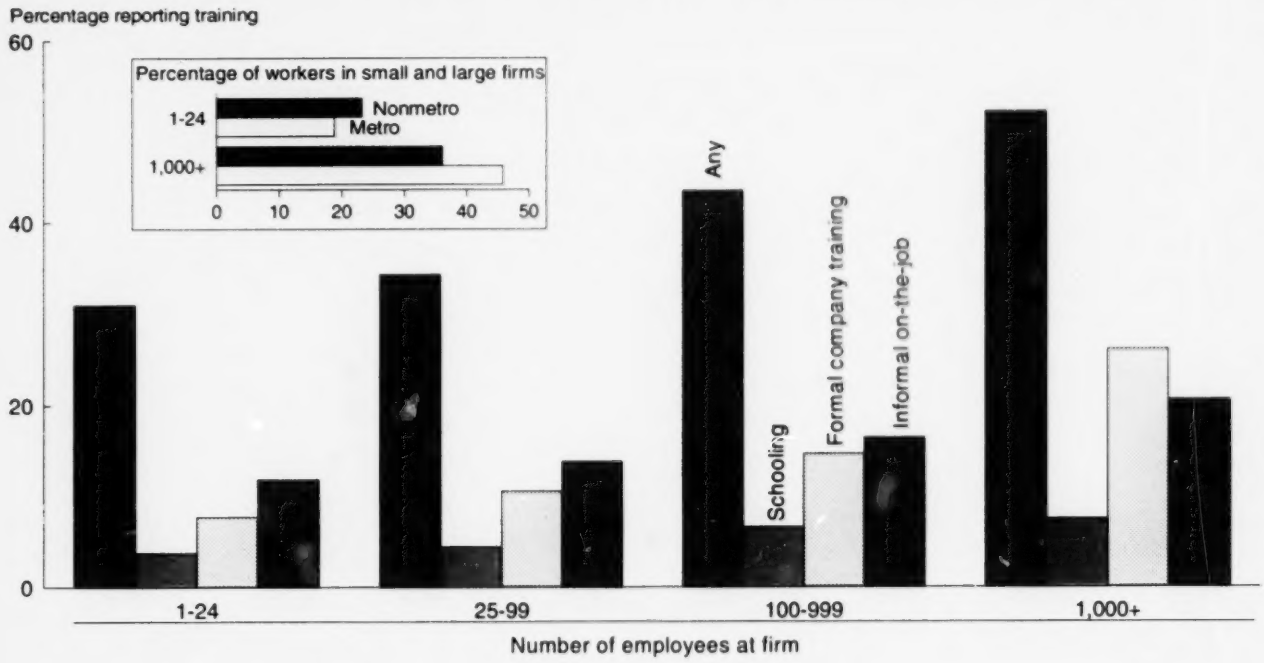
NA=not applicable.

Source: Calculated by the author using data from the January 1991 Current Population Survey.

Figure 5

Share of workers reporting training by size of firm

The smaller the firm, the less likely workers are to receive training, particularly formal training provided by the company; nonmetro workers are more likely than metro workers to be employed by small firms, one of the reasons fewer nonmetro workers get training



Source: Calculated by author using data from the January 1991 Current Population Survey.

Conclusions

Job skills learned after entering the workforce provide crucial qualifications for many good jobs, yet 60 percent of the rural workforce reported receiving no training since beginning their current jobs. Less educated, minority, and southern workers are particularly unlikely to receive additional training. Between 1983 and 1991, the training rate for nonmetro workers rose modestly, but fell behind the more rapidly rising metro training rate. The rural training gap appears to have resulted, in part, from an increased concentration of the most skilled jobs at urban production sites, which resulted in relatively low rural demand for trained workers. The typically smaller size of rural firms, their more limited access to colleges and other external training sources, and the lower educational and literacy levels of the rural workforce probably result in higher unit training costs.

Although employer-provided training dwarfs government training programs, public assistance with meeting employers' training needs can play an important role in rural development programs targeting high-wage job growth, particularly through involving colleges and universities in these efforts. The small size and remoteness of many rural employers is a barrier to workforce training and suggests a need for adult education and industrial extension programs to devote significant resources to outreach efforts designed to reach these firms and their employees. Another concern is that current training patterns strongly favor workers who already have the best education and job skills, leaving most of the less educated and minority workers untrained and unlikely to advance to more technical jobs. It is important, however, to balance concerns for equalizing training access with the need to target training assistance where it can contribute most to modernizing rural industry.

For Further Reading. . .

N. Bowers and P. Swaim, "Recent Trends in Job Training," *Contemporary Economic Policy*, Vol. 12, No. 1, Jan. 1991, pp. 79-88.

Commission on the Skills of the American Workforce, *America's Choice: High Skills or Low Wages*, National Center on Education and the Economy, Rochester, NY, 1990.

M.L. Dertouzos, R.K. Lester, R.M. Solow, and the MIT Commission on Industrial Productivity, *Made in America: Regaining the Productive Edge*, MIT Press, Cambridge, MA, 1989.

C. Ichniowski and K. Shaw, "Old Dogs and New Tricks: Determinants of the Adoption of Productivity-Enhancing Work Practices," *Brookings Papers on Economic Activity: Microeconomics 1995*, Brookings Institution, Washington, DC, pp. 1-65.

S. Rosenfeld, *Smart Firms in Small Towns*, The Aspen Institute, Washington, DC, 1992.

R. Teixeira and L. Mishel, *The Myth of the Coming Labor Shortage in Rural Areas*, Economic Policy Institute, Washington, DC, 1992.

Office of Technology Assessment, U.S. Congress, *Worker Training: Competing in the New International Economy*, OTA-ITE-457, Government Printing Office, Washington, DC, 1990.

Data and Methods

The Bureau of the Census interviews a nationally representative sample of approximately 60,000 households each month for the Current Population Survey (CPS), which is the primary source of labor force information for the United States. In 1983 and 1991, the standard January CPS questionnaire was augmented by a series of questions concerning job skill qualifications and skill-improvement training on currently held jobs. Workers were first asked whether they required qualifications to obtain their current jobs and whether they had received training since being hired. For workers answering "yes" to either question, additional information was collected about this training. (See Bowers and Swaim in For Further Reading for a more detailed description of the CPS job training supplements.)

A Caution about the Data

CPS respondents' answers to the qualifications and training questions were inevitably somewhat subjective and should not be treated as precise measures of training investments and job skills. For example, jobs may require literacy, communications, or quantitative skills that most workers view as too generic to report as required job qualifications. Similarly, many survey respondents are apt to overlook training that is largely an automatic result of doing a job and getting "up to speed." The author's personal experience with training programs suggests that the CPS data can also exaggerate training activities. Some of the training reported by workers may not have significantly enhanced their productivity.

Despite this imprecision, the CPS training data provide a valuable window into firms' training strategies and workers' skills. The evidence on wage premiums strongly suggests that workers reporting qualifications or training generally are more productive than other workers, even if it is difficult to gauge precisely how much more productive. Furthermore, comparisons of training rates across groups of workers or different time periods should provide reliable indicators of differences in training, because any tendency of the CPS data to over- or understate training will tend to cancel out these differences. The data on skill upgrade training received by incumbent workers is emphasized in this article, rather than the data on hiring qualifications, because "training" seems somewhat more concrete than "qualifications" and more closely linked to high-performance production strategies.

Regression Analysis of Wage Premium

Following a methodology widely used by labor economists, I estimate the labor market premium for the skills learned from training by the coefficient of a dummy variable for qualifications or training from a wage regression. More precisely, the natural logarithm of individual earnings is regressed on this dummy variable and an extensive list of control variables, measuring other factors that affect an individual's earnings. These control variables include potential labor market experience and its square, tenure with current employer and its square, and dummy variables for gender, married, a gender-married interaction, race (Black, other nonwhite), Hispanic, veteran, region (Northeast, Midwest, West), part-time job, and union membership. The squared terms for years of experience and job tenure accommodate the tendency for wages to rise most rapidly in the early years of a worker's career or employment with a particular firm. The choice of log earnings as the dependent variable also improves the model's fit and means that the training coefficient estimates the percentage increase in earnings associated with having received that type of training.

Elizabeth J. Greenberg

More Metro than Nonmetro Students Have Access to Computers, But Their Rates of Usage are Similar

Computers are available to students in most U.S. high schools, but they are most likely to be available in schools in or near urban areas. Both metro and nonmetro schools outside the South are more likely to have computers available to students than are Southern schools. Although computer availability varies by how urban a county is and the region in which the county is located, actual student use of computers does not vary as much by location. Many students appear not to be using the computers available in their schools.

More Metro Than Nonmetro 12th Graders Have Computers Available for Their Use in School

According to data from the 1992 National Assessment of Educational Progress, 91 percent of metro students have computers available to them in math classes compared with 78 percent of nonmetro students. (See "Data and Definitions," p. 64, for a discussion of how these data were coded and analyzed.) This difference in the availability of computers to students is not simply a function of the tendency for metro schools to be larger than nonmetro schools. In fact, when school size is taken into account, the differences between metro and nonmetro schools become even larger. In schools with 400 to 800 students, 96 percent of metro students have computers available in math classes, compared with 78 percent of nonmetro students (fig. 1).

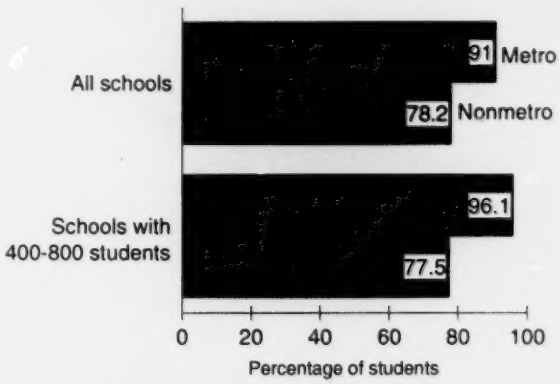
Ruralness as a factor in determining how likely students are to have computers available in their classrooms is further supported by matching the student data with the ERS urban-rural continuum code for the county in which the student attends school. There is a clear pattern that the more rural a county is, the less likely it is to have computers available in math classes (fig. 2). For example, in the core counties of the largest metro areas, 92 percent of students have computers available in math classes. In totally rural counties not adjacent to a metro area, 70 percent of students have computers available in math classes.

In addition to ruralness, proximity to metro areas has some effect on the availability of computers for students. Students in totally rural counties adjacent to metro areas are somewhat more likely to have computers available than are students in rural counties not adjacent to metro areas. Likewise, students in the more urban nonmetro counties are more likely to have computers available if the counties are adjacent to metro counties (fig. 2).

Figure 1

Share of 12th graders in schools with computers available for math class, 1992

Metro schools are more likely to have computers available for students than nonmetro schools, even when larger schools are compared



Source: Calculated by the author using data from the 1992 National Assessment of Educational Progress.

Elizabeth Greenberg is a social science analyst at Washington State University at Pullman.

The difference in availability of computers between urban and rural students applies in all regions of the United States (fig. 3). The gap between metro and nonmetro availability is largest in the South, where rates of computer availability are the lowest in the country. These regional differences support the findings reported in other articles in this issue, which show that the South, particularly the rural South, is still at a disadvantage educationally when compared with the rest of the United States. The lower availability of computers for Southern students should concern policymakers because it may make it more difficult for Southern students' achievement scores to catch up with those of the rest of the country.

Metro and Nonmetro Students' Frequency of Computer Use Is Quite Similar

When 12th graders were asked how often they used computers, the answers of metro and nonmetro students were remarkably similar. In fact, rates of computer use were slightly higher for nonmetro students, although the difference was not statistically significant. Eight percent of metro students reported using computers almost every day compared with 10 percent of nonmetro students. At the other end of the spectrum, 71 percent of metro students reported never or hardly ever using computers compared with 69 percent of nonmetro students (fig. 4).

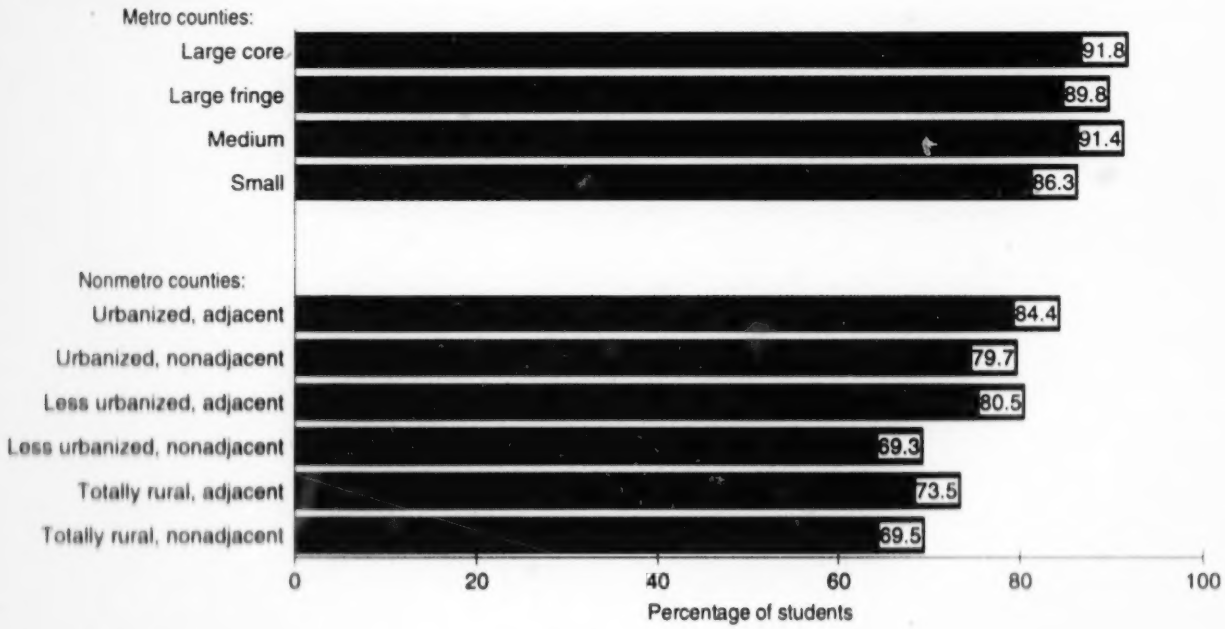
These rates vary somewhat regionally. As would be expected from the data on computer availability, Southern nonmetro students are most likely to report that they never or hardly ever use a computer. Among nonmetro students, 73 percent of those in the South fall into the lowest category of computer use compared with 63 percent of those in the North and 69 percent of those in the West. Because the nonmetro sample of students asked about computer use was quite small (see "Data and Definitions"), I was not able to test for differences in computer use among students living in the 9 ERS rural-urban continuum county groups.

The October 1993 Current Population Survey (CPS) shows substantially higher rates of computer use by high school students than the 1992 National Assessment of Educational Progress (NAEP) does (fig. 5). Some of this difference may be caused by the CPS data being almost 2 years newer than the NAEP data. Computer use has undoubtedly increased somewhat during each year of the 1990's. Much of the difference between the two data sets is probably because the CPS data primarily represent par-

Figure 2

Share of 12th graders in schools with computers available for math class by rural-urban continuum, 1992

The more rural the county in which a 12th grader lives, the less likely he or she is to have a computer available in math class

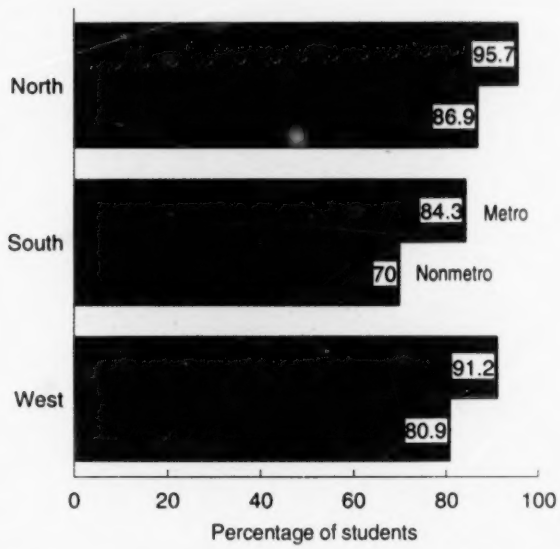


Source: Calculated by the author using data from the 1992 National Assessment of Educational Progress.

Figure 3

Share of 12th graders in schools with computers available for math class by region, 1992

Metro students are more likely to have computers available for math class than nonmetro students in all regions; the South, both metro and nonmetro, lags the rest of the country in the availability of computers



Source: Calculated by the author using data from the 1992 National Assessment of Educational Progress.

ents' reporting on their children's activities (see Data and Definitions, p. 64). Although the CPS shows higher rates of computer use than the NAEP does, it also shows relatively small differences between metro and nonmetro areas. According to the CPS, 47 percent of metro students never use a computer, compared with 41 percent of nonmetro students. Like the NAEP, the CPS shows the lowest rates of computer use among southern nonmetro students. According to the CPS, 48 percent of southern nonmetro students never use a computer, compared with 36 percent of northern and 32 percent of western nonmetro students.

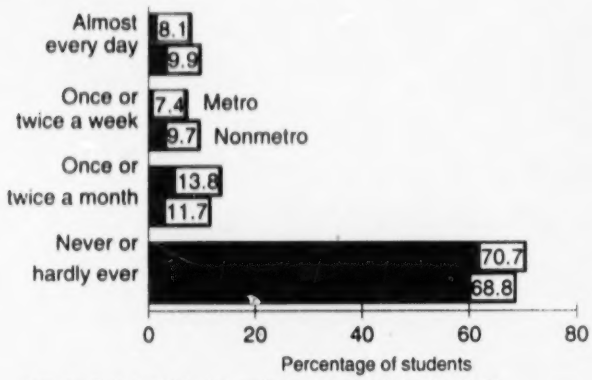
Conclusions

One reason that computers appear to be available to more students than would be expected from the students' responses to the question of how often they use computers is that the NAEP data set does not contain a measure of how many computers are available in each classroom. If only one or two computers are available per class, I would not expect all students to be able to use them daily or even weekly. In addition, having only a few computers available makes it quite difficult for a teacher to plan a lesson that requires the use of computers.

Figure 4

Frequency of computer use by 12th graders, 1992

Rates of computer use are almost identical for metro and nonmetro 12th graders as reported by the students themselves

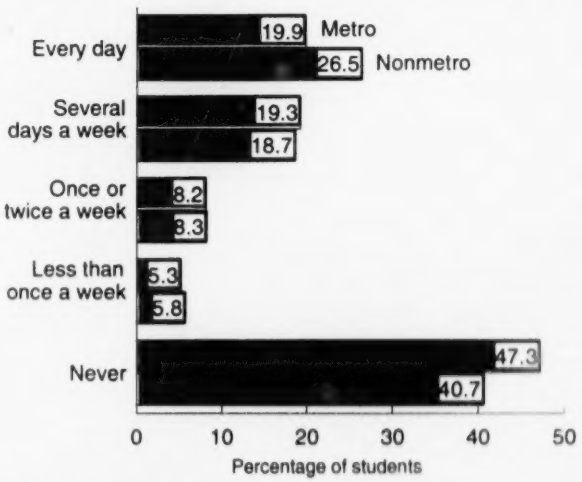


Source: Calculated by the author using data from the 1992 National Assessment of Educational Progress.

Figure 5

Frequency of computer use by all high school students, 1993

Rates of computer use for metro and nonmetro students are higher when reported by their parents or other adults



Source: Calculated by the author using data from the October 1993 Current Population Survey.

The data also do not indicate the model and type of computers available in classrooms. Many school computers are older models for which software may be difficult to obtain, limiting their usefulness in the classroom.

Other researchers have also found that computers are available more frequently than they are used. In a 1995 study, the Office of Technology Assessment points to deficiencies in teacher training as a primary reason that computers are not used more extensively in classrooms. One of their recommendations is that "helping teachers to use technology effectively may be the most important step to assuring that current and future investments in technology are realized" (Office of Technology Assessment, p. 2). The gap between computer availability and computer use suggests that this finding is true in rural areas as well as nationally.

However, in rural areas, particularly in the South, computers are still not widely available in schools. Helping schools purchase computers, as well as training teachers in computer use, may be necessary if rural students are to have the same educational opportunities as urban students.

For Further Reading. . .

U.S. Congress, Office of Technology Assessment, *Teachers and Technology: Making the Connection*, OTA-EHR-616, April 1995.

Data and Definitions

Most of the data analyzed in this article come from the 1992 National Assessment of Educational Progress (NAEP). Data for the 1992 NAEP were collected between October 1991 and May 1992. In addition to testing the cognitive achievement levels of students, the NAEP asked both students and their schools' principals (or the principals' designated representatives) a series of background questions, including questions on computer availability and use in the school. I used data from the school questionnaire, as well as data from the questionnaires administered to 12th graders who took the mathematics achievement test. Questions about the availability of computers in the school were asked of all principals. Questions about computer use were asked only of students taking the mathematics achievement test.

Because I am primarily interested in the question of what opportunities are available for students, I attached data from the school questionnaires to all student records from each school. The analysis reported in this article is then in terms of what percentage of students have the opportunity to use computers, rather than what percentage of schools have computers available. Student questionnaires numbered 18,328, of which 3,609 were from students attending school in nonmetro areas. The cases are weighted to represent the 12th grade population of the United States.

School principals were asked several questions about the availability of computers in their schools. For this analysis, I combined three of those questions: (1) "Are computers always available in math classrooms?" (2) "Are computers available to bring to math classes?" and (3) "Are computers grouped in a lab for math classes?" If the principal answered yes to one or more of the three questions, I coded the school as having computers available for math class and the students in the school as having the opportunity to use computers in math class. Prinicipals were also asked comparable questions about the availability of computers in English classes. Their answers showed the same geographic patterns as for computer availability in math classes, so I did not report the English class results in this article.

The Census Bureau's Current Population Survey (CPS) also asked questions about computer use in schools in a special supplement conducted in October 1993. The CPS is a household survey in which one respondent answers questions about all members of the household. The question I analyzed, "How often does ____ use computers in school?" was asked about each household member currently enrolled in school. It was generally answered not by the student, but by their parent or another adult in the household. A very small percentage of students aged 15 or older responded to the questionnaire themselves and thus answered the question about themselves. Because parents, particularly parents of high school students, are less familiar than students and principals with what actually goes on in school, I consider the CPS data to be less reliable than the NAEP data when analyzing school practices.

To analyze regional differences, I collapsed the data from the Northeast and Midwest census regions into one category called "North," because the nonmetro Northeastern sample is quite small in both data sets and is, therefore, subject to high sampling error.

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